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Research Article

Species survey of the *Hylaeus* subgenus *Paraprosopis* Popov, 1939 in the Eastern Hemisphere (Hymenoptera, Anthophila, Colletidae)

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Abstract

This study provides an overview of the species of *Hylaeus* (*Paraprosopis*), in the Palaearctic region and adjacent areas. A total of 37 species are identified, each of which is presented with a morphological diagnosis and comparative description, and illustrations of the faces of both sexes and the main features of the male terminalia. In addition, information on the distribution is given. Identification keys for specific geographic areas are provided for the species. A more detailed study in the Canary Islands revealed three new species, *Hylaeus* (*Paraprosopis*) *gomerensis* Haeseler, **sp. nov.**, *H.* (*Paraprosopis*) *hierro* Haeseler, **sp. nov.**, and *H.* (*Paraprosopis*) *palmensis* Haeseler, **sp. nov**. Two known species are excluded from the subgenus *Paraprosopis*: *Hylaeus omanicus* Dathe, 1995 – now placed in subgenus *Prosopis*, **comb. nov.**; *Hylaeus krombeini* Snelling, 1980 from Sri Lanka is provisionally placed as subgenus incertus.

Key Words

Distribution, identification key, male terminalia, new species, taxonomy, zoogeography

Introduction

Paraprosopis Popov, 1939 is one of the larger groups within *Hylaeus* Fabricius, 1793 in terms of the number of species, and it is widespread. Most species have been found in the temperate zones of Eurasia and the New World, but some occur in North Africa and India. Their distribution in the Southwest roughly corresponds to the biogeographical boundaries of a Saharo-Arabian bio-realm (Schmitt 2020: 15 et seq.). In Arabian Peninsula and northwestern India, the subgenus is represented by six species. Apparently, the species richness of the taxon is concentrated in the Mediterranean region, and is, according to our observations, mirrored by the higher number of individuals found there. Michener (2007: 211) listed a total of 51 species. In recent years, a number of species have been added, of which often only the types are known. It therefore seems useful to provide guidance on identification, along with an overview of what is currently known. Accordingly, the present study reviews the species spectrum in the Palaearctic region and some adjoining territories, and provides identification keys for certain geographic regions.

Metz (1911: 92) was the first author to propose a grouping of species within the genus *Hylaeus*, based on extensive North American material. „By means of the [male] genitalia the genus is naturally divided into three very distinct groups or divisions … These I have called the “Modestus Division”, the “Cressoni Division” and the “Asininus Division”. These three divisions did not

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achieve long-term acceptance, but the approach of using the male terminalia as a basis for an infrageneric classification is, in principle, still valid for all subgenera to date.

The Asininus Division corresponds to the later subgenus *Paraprosopis*, to which today belong the three species originally included, *Hylaeus asininus* (Cockerell & Casad, 1895), *H. megalotis* (Swenk & Cockerell, 1910) and *H. cookii* (Metz, 1911). As their main diagnostic character, Metz (1911: 136 et seq.) mentioned some form of a membranous flap at the apex of the seventh ventral plate. "No pubescence is found on the plate except a slight amount on the basal lobe; and there are no tooth-like projections … The eighth ventral plate always has apical lobes …". However, he also pointed out that the apical lobes were "differing in different species".

Méhelÿ's grandiose work (1935: 50, 157) provided the solution to our problem. He classified eight taxa in his subgenus "X. Campanularia", which is characterized by the „Anhang des 7. Sternits [of males] eine in der Mitte umgebogene, farblose, glockenförmige Membran". The species in question – *pictipes*, *minuta* (=*sinuatus*), *soror*, *xanthopoda*, *diplonyma* (=*taeniolatus*), *ater*, *lineolatus* und *clypearis* – may be considered the key taxa of the subgenus, and their presentation in the above work remains unsurpassed. Unfortunately, Méhelÿ's nomenclatural approach often did not comply with all the formal requirements of the ICZN. No type species was designated for *Campanularia*, and the name is preoccupied by *Campanularia* Lamarck, 1816, a marine hydrozoan; these errors were corrected by Popov (1939: 169).

In a way, the subgenus *Paraprosopis* is defined in negative terms: The lobes of sternum 7 have no comb teeth or other conspicuous structures, and sternum 8 also appears relatively simple and rather reduced. This can tempt one to include species that cannot be assigned elsewhere, and the suspicion that *Paraprosopis* is a "Sammelkategorie" (collective category), and might be paraphyletic, is obvious. Later authors (e.g. Warncke 1972; Dathe 1980) made more or less justified changes, for example for *Hylaeus albonotatus*, *H. clypearis*, *H. lineolatus* or *H. styriacus*. The species which we assign here to the subgenus *Paraprosopis*, all share a positive character in possessing membranous, transparent apical lobes on sternum 7, which excludes *Hylaeus omanicus* and *H. albonotatus* and makes *H. styriacus* a borderline case. However, it makes little sense to speculate further here, since DNA analysis is available as a method for examining taxonomic relationships more closely, and even for quantifying species distances. In any case, the level at which taxa below the genus level are defined is largely a subjective decision. In view of the pending molecular genetic studies, we do not wish to claim that this study represents a revision at subgeneric level. Rather, particular emphasis is placed on how to recognise the included species. "In-depth analyses that keep their value and usefulness for a long time are only possible on the basis of solid initial data" (Jaschhof et al. 2024), and these initial data should be given here.

Material and methods

The morphological terminology follows Michener (2007); for special applications see also Dathe (2014). The indications of strength and relative density of the integument punctation are given according to Dathe (2014). The following abbreviations are used in the description of new species: N – number of specimens examined; TL – total (body) length; HL:HW – head length to width ratio (head index); UFW:LFW – upper to lower face width ratio; MP:FS(1/5) – length of maxillary palp to length of flagellomeres 1–5 ratio. Measurement data for multiple specimens are presented as a range, with the mean value in parentheses. Values in square brackets such as [7/48] indicate the number of specimens with a particular character in relation to the total number of specimens examined. Metasoma terga and metasoma sterna are denoted by the abbreviations T1, T2... and S1, S2... respectively.

The specimens were studied with a stereomicroscope Olympus SZX12, the photos taken with a Leica camera and Leica Application Suite vs. 4.12. The stacks of digital images were processed using Helicon Focus 8.2.

The collections mentioned in the text are abbreviated as follows:

AMNH	American Museum of Natural History, New York, USA
ELKU	Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan
IZCAS	Institute of Zoology, Chinese Academy of Science, Beijing, China
MICN	Museo Insular de Ciencias Naturales, Tenerife, Santa Cruz de La Palma, Spain
MNHN	Muséum National d'Histoire Naturelle, Paris, France
MZLS	Naturéum, Musée zoologique, Lausanne, Switzerland
NHM	Natural History Museum, London, United Kingdom
NHRM	Naturhistoriska Riksmuseet, Stockholm, Sweden
NZSI	National Zoological Collections of Zoological Survey of India, Kolkata
OLML	Biodiversitätszentrum Oberösterreich, Linz, Austria
SDEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany
SMF	Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany
UMB	Übersee-Museum Bremen, Bremen, Germany
UMO	University Museum of Natural History, Hope Entomological Collections, Oxford, United Kingdom
USNM	National Museum of Natural History, Smithsonian Institution, Washington D.C., USA
ZISP	Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
ZMB	Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin, Germany

ZMUH Finnish Museum of Natural History Luomus, Helsinki, Finland
ZSS Zoologische Staatssammlung, Munich, Germany

The subgenus *Paraprosopis*

Hylaeus (*Paraprosopis*) Popov, 1939

Prosopis (*Campanularia*) Méhelÿ, 1935, nec Lamarck, 1816. Name preoccupied; invalid because no type species was designated. According to the ICZN, 3rd ed., Art. 13(b), the designation of a type species was prescribed after 1930 for subgenera containing more than one species.
Prosopis (*Paraprosopis*) Popov, 1939: 169. Type species: *Hylaeus pictipes* Nylander, 1852, by original designation.

Most species of the subgenus are small and slender, with a total body length between 4 and 6 mm. With a few exceptions, they are completely black in colour with genus-typical light markings on the pronotum, tegulae and calli. The legs are usually completely or predominantly light yellow. The only species that stands out with a rich yellow pattern on the mesosoma and metasoma is *Hylaeus emir*; *H. decaocto* also has yellow spots on the mesosoma.

The male antennal scapes are usually as slender as in the female, but in some species they appear moderately expanded, as in *Hylaeus sinuatus*, *H. xanthopoda*, *H. soror*, *H. donbakeri*, *H. concinnus*, *H. gujaraticus*, *H. azorae*. In the females, the foveae faciales extend to the top of the vertex, but further 'definite' characters are missing. Furthermore, a similar development of the foveae can also be found in other groups of *Hylaeus* outside *Paraprosopis*, and not in all females of the subgenus do the foveae end closer to the ocelli than to the orbits or at least halfway between them; this applies to *Hylaeus styriacus*, *H. emir*, *H. clypearis*, *H. livius*, *H. lactipennis*, *H. taizzi* and *H. samhanicus*.

The characteristic feature in the structure of the male terminalia is shown in Figs 1–3. The apical lobes of sternum 7 are relatively simply formed, as divided colourless oval membranes, often with an outline resembling butterfly wings. The proximal and distal parts are at an angle to each other (Fig. 1). The surfaces generally have no setae on the margin: exceptions are *Hylaeus lineolatus*, *H. clypearis*, *H. livius* and *H. taizzi* with fine setae on the basal part. This basic pattern varies in many ways, so that size and shape can be very different. In most cases, the distal part of the apical lobes is membranous and transparent (which is why it is often difficult to prepare, and almost impossible to photograph in incident light), while the basal part can often be more or less sclerotised. Some of the details in the drawings by Méhelÿ (1935) are much better visible under transmitted light, but the spatial impression is lost. Sternum 8 consists of a basal lobe, more or less triangular, and an apical lobe, which varies in length and width; it divides apically into two parts, whose edges usually bear a few short bristles.

The genital capsules differ in shape, in particular the variable ratio of the length of the basal part (gonocoxite) and the apical free part of the gonoforcipes (gonostylus). The shape of the tip of the gonoforcipes can also differ between species. The penis valves are always parallel when viewed dorsally, usually with a keel in the middle. In some species, horizontal surfaces are formed instead of the keel (*Hylaeus donbakeri*, *H. samhanicus*, *H. decaocto*, *H. taizzi*). The apical setae are strong, long and feathery.

Species groups within the subgenus *Paraprosopis* can only be defined to a limited extent. For example, *Hylaeus lineolatus*, *H. livius* and *H. clypearis* belong closer to each other, as do *H. sinuatus* and *H. soror*, but this brings little insight. Snelling (1970a: 28) stated for the North American species: „Species groups are so poorly delimited that I see little point in attempting to define them except in very general terms."

The species of the *Hylaeus* subgenus *Paraprosopis*

The following species are included here according to their geographical distribution:

aenigmatis Dathe, 2022 Israel
ater (Saunders, 1903) Canary Islands
azorae (Warncke, 1992) Azores
canariensis Erlandsson, 1983 Canary Islands
clypearis (Schenck, 1853) Palaearctic
concinnus Cockerell, 1924 Far East
decaocto (Warncke, 1992) Iran: Yazd
dinkleri (Friese, 1898) Egypt, Israel
donbakeri Dathe, 1995 UAE, Iran: Fars
emir Dathe, 2000 Oman, UAE
gomerensis Haeseler, sp. nov. Canary Islands
gribodoi (Vachal, 1895) Algeria
gujaraticus (Nurse, 1903) Levant to India
guptai Chandra & Saini, 2021 India: Arunchal
hierro Haeseler, sp. nov. Canary Islands
hirashimai Ikudome, 1989 Japan
hohmanni Dathe, 1993 Canary Islands
incomitatus Snelling, 1970 Japan
lactipennis (Benoist, 1957) Morocco, Tunisia
lineolatus (Schenck, 1861) Palaearctic
livius (Warncke, 1992) Morocco
lushanicus Dathe, 2015 China: Sichuan
maderensis (Cockerell, 1921) Madeira
mendibus (Warncke, 1972) Libya
meridianus Yasumatsu & Hirashima, 1965 Japan
munageus Ikudome, 2004 Japan
nigrocallosus Morawitz, 1890 China: Sichuan
palmensis Haeseler, sp. nov. Canary Islands
pictipes Nylander, 1852 Palaearctic
samhanicus Dathe, 2022 Oman
sinuatus (Schenck, 1853) Palaearctic
soror (Pérez, 1903) Palaearctic
styriacus Förster, 1871 Palaearctic
taeniolatus Förster, 1871 Palaearctic

taizzi Dathe, 2010 Yemen
xanthopoda (Vachal, 1895) Levant
yasumatsui Snelling, 1970 Japan

The following species are not placed in *Paraprosopis*, unlike in earlier studies:

Hylaeus albonotatus (Walker, 1871) – sgen. *Prosopis*
Hylaeus omanicus Dathe, 1995 – sgen. *Prosopis* – comb. nov.
Hylaeus krombeini Snelling, 1970 – sgen. incertus (see Addendum)

Continental palaearctic and adjacent areas

Hylaeus (*Paraprosopis*) *pictipes* Nylander, 1852

Sphex annulata Panzer, 1798: 53.1. ♂. Type material lost. Austria. Secondary homonym of *Apis annulata* Linnaeus, 1758.
Hylaeus pictipes Nylander, 1852: 95–97. ♀. Sweden, Västergötland. Lectotype ♀ NHRS Stockholm.
Prosopis varipes Smith, 1853: 21. ♂ (nec ♀). Britain. Lectotype ♂ NHM London.
Prosopis excisa Schenck, 1853: 216–217. ♂♀. Germany, Nassau. Holotype ♂ SMF Frankfurt am Main.
Hylaeus vicinus Förster, 1871: 1055–1056. 1 ♀. Germany, Aachen. Holotype ZSS Munich. Secundary homonym of *Prosopis vicina* Sichel, 1867.
Hylaeus melanarius Förster, 1871: 1066–1067. ♀. Germany, Aachen. Holotype ZSS Munich.
Hylaeus claripennis Förster, 1871: 1069–1070. ♀. Germany, Aachen. Holotype ZSS Munich.
Hylaeus panzeri Förster, 1871: 1082. Austria. New name for *Sphex annulata* Panzer, 1798.
Prosopis trimaculata Schenck, 1875: 326. ♂. Germany, Nassau. Holotype SMF Frankfurt am Main.
Prosopis aquisgranensis Dalla Torre, 1896: 25. New name for *Hylaeus vicinus* Förster, 1871.
Prosopis pictipes var. *nigriscutum* Alfken 1913: 27. ♂. Germany, Aachen. Holotype ZMB Berlin.

Diagnosis. Small, dainty species with fine sculpture of the mesosoma and slender metasoma. Males can be clearly identified by the tapering gonoforcipes; terminalia Fig. 52. Scapes slender, often with yellow line on front. Females with light yellow side spots, usually large, filling out; sometimes also clypeus spotted (Fig. 4); not always easy to distinguish from *H. taeniolatus* (Fig. 5).

Distribution. Europe: in the North to 60°N in Sweden (Småland) and Finland (Åland Islands), east to the Urals (Perm). In the west, it is recorded from the Iberian Peninsula and in southern England and Wales. Asia: Turkey, Black Sea coast (Sinop, Erzurum; Özbek and Dathe 2020).

Remarks. The species has now also become established in the New World, as reported by Gibbs and Dathe (2017): Canada (Ontario), and USA (Ohio, Pennsylvania). The wide distribution of *H. pictipes* in Europe suggests it may also thrive under a broad range of climate conditions in North America.

Hylaeus (*Paraprosopis*) *taeniolatus* Förster, 1871

Hylaeus taeniolatus Förster, 1871: 1068–1069, ♀. Italy, Sicily. Holotype NHM London.
Prosopis arata Vachal, 1895: 324, ♂. Algeria. Holotype MNHN Paris.
Prosopis luteipes Benoist, 1943: 42, ♂. Morocco, Agadir. Lectotype MZLS Lausanne.
Hylaeus (*Paraprosopis*) *diplonymus* sensu Méhelÿ (1935), Benoist (1959), Leclercq (1964) and Dathe (1980), not *Prosopis diplonyma* Schulz, 1906.

Diagnosis. A small species with mostly fine sculpture of the mesosoma and slender metasoma, very similar in these respects to *Hylaeus pictipes*. However, males are clearly distinguished by the apically rounded gonoforcipes; terminalia Fig. 53; S8 with a relatively broad apical lobe, extremely finely bristled distally. Scapes slender, yellow-lined or with a spot at the apex (Fig. 5). The light colouration is more intense and extensive than in *H. pictipes*. Legs are often entirely yellow except for the base of the femur. The colour and sculpture characteristics vary considerably between the Mediterranean islands, where the species is very common: the punctation is variable, ranging from fine to moderate and sparse to close.

Distribution. West Palaearctic. Africa: Canary Islands, Morocco to Egypt. Europe: Portugal to Turkey, southern Central Europe to southern Ukraine, Mediterranean islands. Asia: Anatolia, Cyprus, Lebanon, Israel, Syria, Jordan.

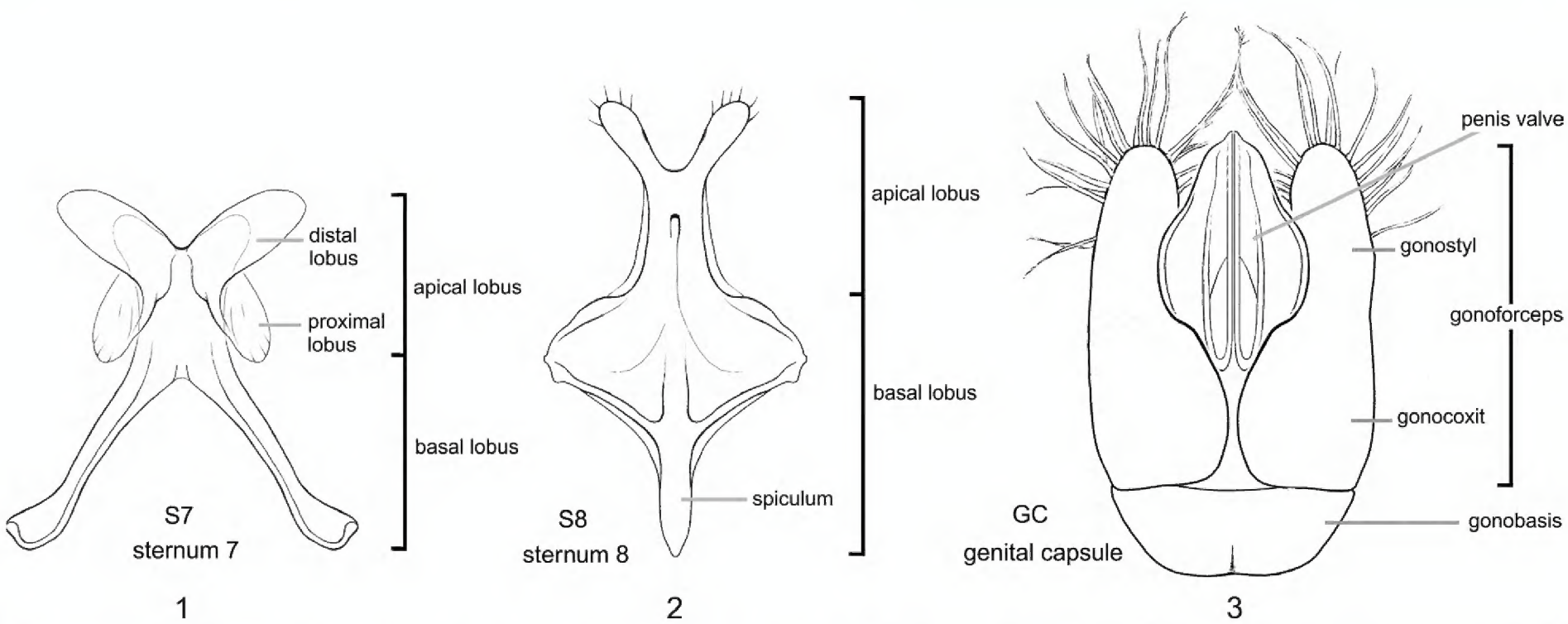
Remarks. Warncke (1972: 749) synonymised *Hylaeus taeniolatus* with *H. pictipes* with the simple argument "zutreffende Beschreibung" (matching description). However, a different form of gonoforcipes is a highly significant distinguishing feature in *Hylaeus*. Furthermore, although both taxa occur partly sympatrically, for example in Spain, France and Germany, morphologically intermediate specimens are not known (Doczkal and Schmid-Egger 1993; Rasmont et al. 1995; Ornosa and Ortiz-Sanchez 2004).

Hylaeus (*Paraprosopis*) *aenigmatis* Dathe, 2022

Hylaeus (*Paraprosopis*) *aenigmatis* Dathe, 2022: 207–208. ♂. Israel, Nahal Alexander. Holotype SDEI Müncheberg.

Diagnosis. The only verified specimen known to date (Fig. 25) differs from the morphologically similar *Hylaeus taeniolatus* mainly in the unusual formation of the elongated, deeply incised apical lobe of S8 (Fig. 54), while other features could fall within the range of variation of *H. taeniolatus*. Although *H. taeniolatus* is widespread and quite variable, this special shape of the S8 apical lobe is not known from other western Palaearctic populations. Genital capsule also distinct by very short gonostyli.

Distribution. Israel.



Figures 1–3. Taxonomic characters of *Hylaeus* (*Paraprosopis*) species. Male terminalia, dorsal view, schematic. **1.** Sternum 7 (S7); **2.** Sternum 8 (S8); **3.** Genital capsule (GC).

Hylaeus (*Paraprosopis*) *xanthopoda* (Vachal, 1895)

Prosopis xanthopoda Vachal, 1895: 325, ♀. Egypt, Cairo. Holotype MNHN Paris.

Prosopis schmiedeknechti Friese, 1898: 310–311, ♀♂. Egypt. Lectotype ♀ ZMB Berlin.

Diagnosis. Of the similar species with almost entirely yellow legs, *Hylaeus xanthopoda* is distinguished in both sexes by the dominant shagreen of T1; a scattered, shallow punctation is only vaguely recognisable. The mesonotum is shagreen and only with scattered, fine punctation. In the females, the mask is tripartite, the clypeus yellow-spotted, the lateral spots expanded far upwards and the foveae faciales appear as dark strokes in the yellow field (Fig. 6). The last visible tergites of the males (T6, often also T5) carry a yellow spot, a unique feature of this species. Genital capsule similarly compact as *H. aenigmatis*, but apical lobe of S8 with broad stalk and only distally flatly emarginated (Fig. 55).

Distribution. Algeria, Egypt, Israel, Jordan, Yemen, Oman, Saudi Arabia, Iran: Kerman. According to Gotlieb et al. (2011), this is a common species in Israeli gardens.

Hylaeus (*Paraprosopis*) *dinkleri* (Friese, 1898)

Prosopis dinkleri Friese, 1898: 311–312, ♀ (not ♂). Egypt, Suez. Lectotype ♀ ZMB Berlin.

Prosopis albonotata auctorum nec Walker, 1871.

Prosopis falsifica Alfken, 1930: 221–223, ♀ (not ♂). Egypt, Ghezireh. Lectotype ♀ ZMB Berlin.

Hylaeus (*Paraprosopis*) *dinkleri* (Friese, 1898) – Dathe 1995: 159–160; Lhomme et al. 2020: 67.

Diagnosis. A richly yellow-coloured, dainty species, like *Hylaeus xanthopoda*, with entirely yellow tibiae and tarsi. However, in the males, the labrum and mandibles are black, the scapes only have a yellow longitudinal stripe; last tergites are completely black. Reliable characters are exhibited mainly on the female: bright yellow, dull spots on the facial sides and the clypeus, often also on the supraclypeal area; the lateral spots are significantly shorter on top (Fig. 7). Differences to *H. xanthopoda* are not only in the colour, but also in the sculpture of the mesonotum and metasoma. In both sexes, the integument of T1 is finely punctate, smooth and shiny. The mesonotum is shagreen, but with close moderate punctation. Terminalia of males (Fig. 56): Genital capsule elongate, gonoforcipes slender, apical lobe of S8 broad and deeply notched, finely bristled.

Distribution. Israel, Jordan, Egypt.

Remarks. Finds of this species were often reported as *Hylaeus albonotatus* in the past, for example by Warncke (1972: 750). The designation of lectotypes in the ZMB (Dathe 1995: 159) fixed the independent status of *H. dinkleri*. At least in Egypt, these species are sympatric. An earlier reported occurrence in Morocco (Dathe 1995, Lhomme et al. 2020) is probably wrong; of the 143 specimens Dathe has since examined, none was found west of Egypt.

Hylaeus (*Paraprosopis*) *gujaraticus* (Nurse, 1903)

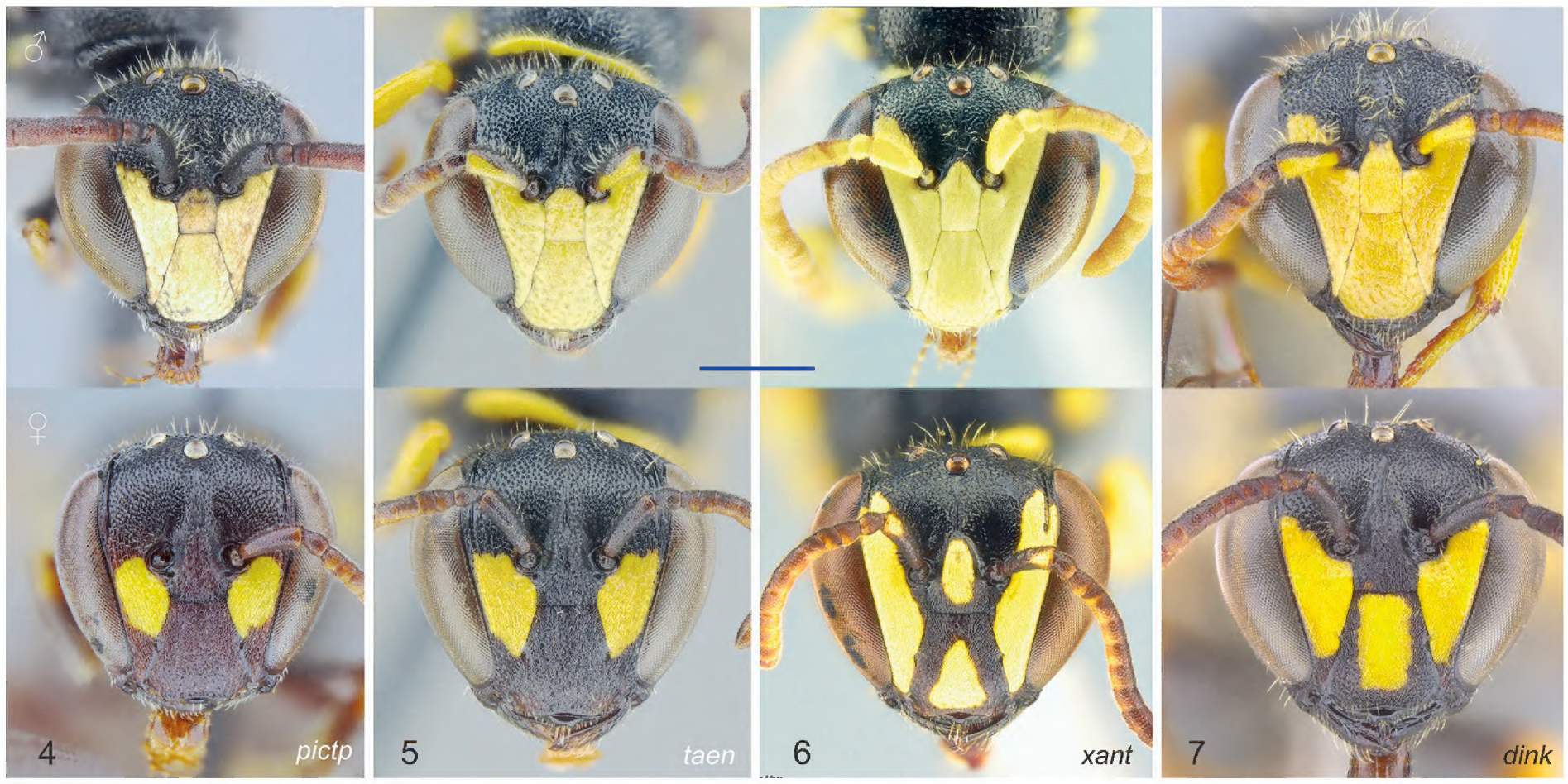
Prosopis gujaratica Nurse, 1903: 535, ♀. India, Deesa. Lectotype NHM London.

Prosopis elata Warncke, 1981: 169–170, ♀♂. Israel, Eilat Bay. Holotype ♂ OLML Linz.

Hylaeus (*Paraprosopis*) *elatus* (Warncke, 1981) – Dathe 1995: 162–163; 2009: 339.

Hylaeus (*Paraprosopis*) *gujaraticus* (Nurse, 1903) – Dathe 2010: 61.

Diagnosis. The species resembles *Hylaeus xanthopoda* in its colouration. The most obvious difference in the male is the shape of the S8 apical lobe, which has a prominent bulge; the proximal parts of the S7 lobes are approximately circular, with a sclerotised margin; genital capsule



Figures 4–7. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **4.** *H.* (*P.*) *pictipes* Nylander; **5.** *H.* (*P.*) *taeniolatus* Förster; **6.** *H.* (*P.*) *xanthopoda* (Vachal); **7.** *H.* (*P.*) *dinkleri* (Friese). Scale bar: 0.5 mm.

with short gonostyli (Fig. 57). The sculptural characters vary according to the geographical origin of the specimens in their shagreen and possible stippling; overall, the sculpture is glossier than in *H. xanthopoda*. The mask is less expanded in both sexes; in specimens from Oman even light yellow to white, otherwise bright yellow. The female mask is usually limited to complete side spots and sometimes a small apical spot on clypeus (Fig. 8).

Distribution. Levant (Egypt: Sinai; South Israel), Arabia (UAE, Oman), Iran: Kerman, Fars, Pakistan, Northeast India: Punjab, Gujarat.

Hylaeus (*Paraprosopis*) *gribodoi* (Vachal, 1895)

Prosopis gribodoi Vachal, 1895: 323, ♂. Algeria, Biskra. Holotype MNHN Paris.

Hylaeus (*Paraprosopis*) *gribodoi* (Vachal, 1895) – Dathe 1995: 162–164.

Not *Prosopis sinuata gribodoi* sensu Warncke 1972: 751, 1992: 757 [= *Hylaeus soror* (Pérez, 1903)].

Diagnosis. *Hylaeus gribodoi*, a very slender species, is particularly noticeable in the female due to a completely rust-coloured mask and yellow scapes (Fig. 9). The labrum and mandibles are also yellow; this colouring is unusual for Palaearctic species and is reminiscent of the species of the *Hylaeus* (*Deranchylaeus*) *xanthostoma* complex (Dathe 2023). The facial foveae are very narrow. The T1 is only very superficially shagreen in both sexes with very scattered and extremely fine punctation. This precludes an assignment to *H. sinuatus* and *H. soror.* Terminalia of the males Fig. 58, distal lobes of S7 narrow.

Distribution. Algeria (Biskra), so far only known from the locus typicus.

Hylaeus (*Paraprosopis*) *lactipennis* (Benoist, 1957)

Prosopis lactipennis Benoist, 1957: 169–170, ♀. Algeria, Beni-Abbés. Holotype MZLS Lausanne.

Hylaeus (*Paraprosopis*) *lactipennis* (Benoist, 1957) – Dathe 1995: 165–166; Lhomme et al. 2020: 68.

Diagnosis. The wings are very pale, the veins including stigma light yellow and transparent, stigma of the male slightly darker. Males with distinct white hair on the mesosoma, which is less developed in females. Male mask white, shiny, as is the front of the scape (Fig. 10). Terminalia of males (Fig. 59): Genital capsule compact, in S8 the apical lobe is significantly enlarged compared to the basal lobe, S7 with large apical lobes, resembling *Hylaeus gribodoi*. Female head outline transverse trapezoid, the lateral spots shortened, similar to *H. sinuatus*. Tergum 1 without shagreen, smooth and shiny with moderate punctation, depressions of the terga paler, with horn-like colour. The tibiae are usually not completely yellow, often with brown spots on the inner sides.

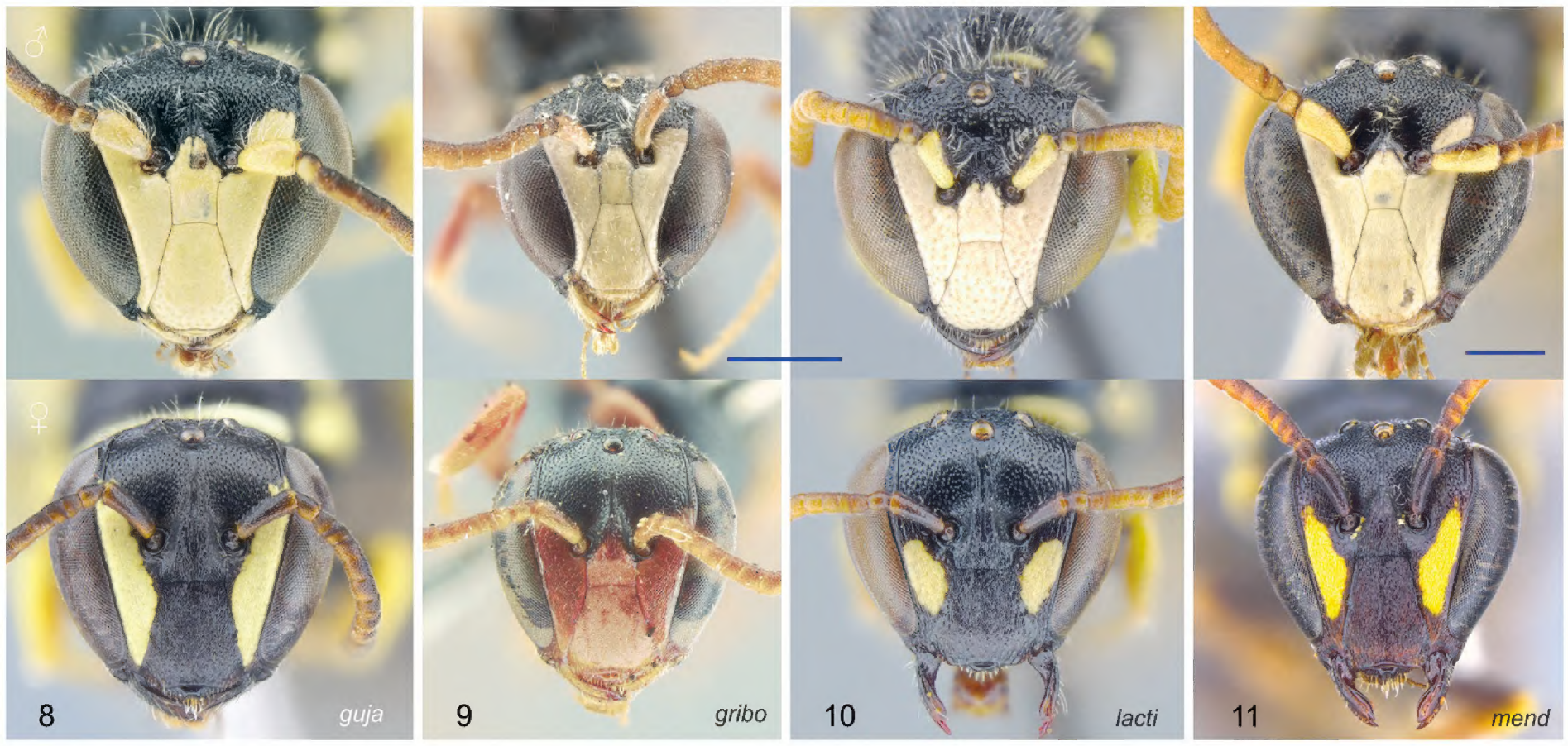
Distribution. Morocco, Tunisia, Algeria.

Hylaeus (*Paraprosopis*) *mendibus* (Warncke, 1972)

Prosopis (*Paraprosopis*) *xanthopoda mendiba* Warncke, 1972: 750, ♀♂. Libya NW, Mendib. Holotype ♀ OLML Linz.

Hylaeus (*Paraprosopis*) *mendibus* (Warncke, 1972), stat. nov.

Diagnosis. This taxon is significantly larger and more robust than *Hylaeus xanthopoda*, as a subspecies of which it was described. This affiliation appears unfounded in view of the clear morphological differences. Mesonotum and mesopleura are distinctly punctate. The propodeum is



Figures 8–11. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **8.** *H.* (*P.*) *gujaraticus* (Nurse); **9.** *H.* (*P.*) *gribodoi* (Vachal); **10.** *H.* (*P.*) *lactipennis* (Benoist); **11.** *H.* (*P.*) *mendibus* (Warncke). Scale bar: 0.5 mm.

rounded, the ribs are greatly reduced, the medial area has no distal edge. The metasoma is more compact, oval in outline instead of fusiform, its surface with cilia; terminal tergites black. The male has a white mask (Fig. 11) and the legs have large black spots. The terminalia differ significantly from *H. xanthopoda* (Fig. 60): S7 apical lobe basally smaller, S8 apical lobe longer and more narrowly stalked, genital capsule with gonocoxite longer than gonostylus. In females, the face has only light-yellow lateral stripes; metasoma finely shagreen with relatively dense minute punctation.

Distribution. Libya.

Hylaeus (*Paraprosopis*) *sinuatus* (Schenck, 1853)

Apis minuta Fabricius, 1793: 342, ♀. Germany, Kiel. Secondary homonym in *Hylaeus* of *Vespa minuta* Rossi, 1790: 89. – Not *Hylaeus minutus* Fabricius, 1798: 272; not *Prosopis minuta* Fabricius, 1804: 295.

Prosopis sinuata Schenck, 1853: 216, ♂ (not ♀). Germany, Weilburg. Holotype ♂ SMF Frankfurt am Main.

Hylaeus sinuatus (Schenck, 1853) ♂♀ – Förster, 1871: 929–931.

Prosopis minuta auctorum, not Fabricius 1798.

Prosopis minuta var. *nana* Alfken, 1927: 225, ♀♂. Spain, Pyrenees. Not *Prosopis nana* Friese, 1924.

Hylaeus (*Paraprosopis*) *sinuatus* (Schenck, 1853) – Dathe 1980: 248–249.

Diagnosis. Larger, more robust species with strong dense punctation of mesosoma. The male is easily recognisable by the facial mask pattern: the white side spots extend to the apex margin and enclose the bases of the scape three-quarters towards the inside (Fig. 12). The scape is weakly broadened, with yellow line at the front. Terminalia of the males (Fig. 61): Genital capsule rounded-rectangular in outline, gonostyli longer than gonocoxites. In the female, the facies side spots are small, almost rectangular and obliquely adjacent to the orbits. Tergum 1 in the male with close strong punctation, in the female smooth and shiny with fine sparse punctation.

Distribution. West Palaearctic. Europe: Spain to Caucasus, north to southern Sweden, Russia to the Urals (Perm, Bashkiria), southern Russia (Dagestan). Asia: Cyprus; Anatolia, northern Iran.

Remarks. Data for southern Europe often refer to *Hylaeus soror*, so careful verification is required.

Hylaeus (*Paraprosopis*) *soror* (Pérez, 1903)

Prosopis soror Pérez, 1903: 233, ♂. France, Bordeaux. Syntypes MNHN Paris (Le Divelec, personal communication).

Prosopis dubitata Alfken, 1904: 323–324, ♀♂. S Europe, N Africa, W Asia. Syntypes ♀ and ♂ ZMB Berlin.

Prosopis minuta soror Pérez, 1903 – Méhelÿ, 1935: 52, 158.

Prosopis (Paraprosopis) sinuata gribodoi sensu Warncke, 1972: 751. Not *Prosopis gribodoi* Vachal, 1895.

Hylaeus (*Paraprosopis*) *soror* (Pérez, 1903) – Dathe 1980: 249.

Diagnosis. *Hylaeus soror* closely resembles *H. sinuatus*, but according to the distribution pattern and the constancy of characters such as the different facial pattern, slimmer head shape and stronger metasomal punctation, it is a good species. In males, the lateral spots are not truncate at the top, but run diagonally to the orbits; those of females are larger, sometimes filling the space completely, the clypeus sometimes with a dot (Fig. 13). Terminalia of males (Fig. 62): Genital capsule compact in outline, gonostyli shorter than gonocoxites. The species are often not possible to distinguish with certainty on the basis of females alone.

Distribution. Circum-Mediterranean, Black Sea region. Africa: Morocco, Algeria, Tunisia. Europe: Portugal, Spain, S France, Italy, Balkans, north to Haute Savoie. Asia: Anatolia, Caucasus (Georgia, Armenia, Azerbaijan), Iran (NW, Fars); Cyprus, Lebanon, Israel, Jordan, Syria.

Remarks. *Hylaeus soror* is obviously very closely related to *H. sinuatus* and was therefore sometimes considered to be its southern form or subspecies. The morphological differences are indeed slight, but this is not an argument from a biological point of view. On the other hand, the sympatric occurrence of the forms in the Mediterranean and Anatolia speaks for their status as separate species. A more precise clarification of this is still pending.

Hylaeus (*Paraprosopis*) *styriacus* Förster, 1871

Hylaeus styriacus Förster, 1871: 1062–1064, ♂. Austria, Graz. Holotype MNHN Paris.

Prosopis tristis Frey-Gessner, 1900: 230–231, ♂. Switzerland. Not checked.

Prosopis styriaca var. *nigroclypeata* Alfken, 1913: 19, ♀. Germany, Bremen. Not found in coll. ZMB.

Prosopis styriaca crecca Warncke, 1992: 776–777, ♀♂. Turkey, Taurus. Holotype ♀ OLML Linz.

Diagnosis. This species is rather isolated morphologically and cannot be assigned to any species group here; even the subgenus is questionable, although the paired membranous apical lobes of the male S7 qualify it for inclusion in *Paraprosopis*. The males of this dainty species with a round face are characterised by rough sculpture with dense, prominent punctation on the mesosoma and T1, while the females can usually be recognised by a yellowish-white spot on the clypeus (Fig. 14) and a dominantly shagreen T1 surface with only indistinct punctation. In contrast to *H. clypearis*, the mesopleura are distinctly shagreen and only sparsely punctate. Terminalia of males (Fig. 63): Genital capsule compact, gonocoxites considerably longer than gonostyli; S7 with small proximal lobe; S8 with short and narrow apical process without bipartite end.

Distribution. Central and Eastern Europe, from SE France to the Volga. Asia: Anatolia to the Caspian Sea (Georgia, Armenia, Azerbaijan), Iran (Fars); south to Lebanon (Boustani et al. 2021).

Hylaeus (*Paraprosopis*) *clypearis* (Schenck, 1853)

Prosopis clypearis Schenck, 1853: 217, ♂. Germany, Nassau. Holotype SMF Frankfurt am Main.

Prosopis angulata Smith, 1853: 22, ♂. Portugal. Types presumably NHML London. Not checked.

Hylaeus floricola Förster, 1871: 982–983, ♂. Germany, Aachen. Holotype SMF Frankfurt am Main.

Hylaeus siculus Förster, 1871: 984–985, ♂♀. Italy, Sicily. Types presumably NHML London. Not checked

Hylaeus blandus Förster, 1871: 985–987, ♀ (not ♂). Croatia, Dalmatia. Holotype ZSS Munich.

Hylaeus opacus Förster, 1871: 1018, ♀. Germany, Aachen. Holotype ZSS Munich.

Hylaeus moniliatus Förster, 1871: 1074–1075, ♀. Italy, Sicily. Holotype NHML London.

Prosopis subopaca Pérez, 1905: 86–87, ♀. Spain, Barcelona. Not checked.

Prosopis clypearis var. *genimaculata* Strand, 1909: 74, ♂. Italy, Sicily. Not checked.

Hylaeus lineolellus Cockerell, 1938: 84–85, ♀. Morocco, Fez. Holotype NHM London.

Diagnosis. *Hylaeus clypearis* is the smallest and probably most common of the *Paraprosopis* species with a transverse callus on S3 of the males. Characteristic is especially their butterfly-like mask with a connected white spot at the base of clypeus and supraclypeal area (Fig. 15). Terminalia of males (Fig. 64): Genital capsule small, almost circular in outline, penis valves not shorter than gonoforcipes; proximal lobes of S8 sclerotised, apically with bristles. Females have triangular face spots that fill the lateral fields. In both sexes, the lateral corners of the pronotum are acute in dorsal view, and the integument is coarsely sculptured with strong subcontiguous punctation.

Distribution. West Palaearctic. All of Europe, north to Denmark; North Africa: Morocco to Egypt; Asia: western Turkey, Levant, Azerbaijan. Mainly in the Mediterranean, including all islands.

Hylaeus (*Paraprosopis*) *lineolatus* (Schenck, 1861)

Prosopis lineolata Schenck, 1861: 312, 323, 1 ♂. Germany, Nassau. Holotype SMF Frankfurt am Main.

Hylaeus inaequalis Förster, 1871: 1061–1062, ♂♀. Austria, Vienna. Syntypes ♂♀ ZSS Munich.

Prosopis lineolata var. *nigrifacies* Alfken, 1913: 18, ♀. Germany, Bremen. Not found in ZMB.

Prosopis creticola Strand, 1915: 146–147, ♂. Greece, Crete. Holotype SDEI Müncheberg.

Prosopis lineolata rudis Pittioni, 1950: 33–34, ♂♀. Cyprus, Kykkou. Holotype ♂ ZMUH Helsinki.

Prosopis lineolata ferina Warncke, 1992: 781, ♀♂. Morocco, Tizi-n-Test. Holotype ♀ OLML Linz.

Diagnosis. This species is unmistakable and unique in the subgenus in that the male's face is completely black except for a small narrow white spot next to the base of the scape (Fig. 16). Their metasoma usually has a prominent three-sided callosity on S3. The face of the female is distinctly elongated, with a long, narrow white stripe at the outer edge of the paraocular area. In both sexes, the lateral corners of the pronotum are acute in dorsal view, and the integument is heavily sculptured with moderate to strong subcontiguous punctation. The punctation is somewhat finer in the female and less dense on the metasoma.

Figures 12–15. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **12.** *H.* (*P.*) *sinuatus* (Schenck); **13.** *H.* (*P.*) *soror* (Pérez); **14.** *H.* (*P.*) *styriacus* Förster; **15.** *H.* (*P.*) *clypearis* (Schenck). Scale bar: 0.5 mm.

Male terminalia (Fig. 63): Genital capsule distally expanded into a flattened, tongue-like shape, the penis valves distinctly shorter than the gonoforcipes; proximal lobes of S8 sclerotised, with setae at the apex.

Distribution. West Palaearctic. Western and southern Europe: north to Germany (Brandenburg); Ukraine, southern Russia; Western Asia: Anatolia to Georgia, Armenia and Azerbaijan, in Iran south to the province of Fars; Lebanon, Israel (Monks 2020: 269); Africa: Morocco to Egypt.

Remarks. This widespread species tends to develop geographic forms that differ in colouration and spotting, which has often led to new descriptions, usually as subspecies.

Hylaeus (*Paraprosopis*) *livius* (Warncke, 1992)

Prosopis livia Warncke, 1992: 779–780, ♀♂. Morocco, Tizi n'Test. Holotype ♀ OLML Linz.

Hylaeus (*Paraprosopis*) *livius* (Warncke, 1992) – Dathe in Lhomme et al. 2020: 68.

Diagnosis. The species corresponds to the pattern described for *Hylaeus lineolatus* and *H. clypearis* in the essential morphological characters: pointed pronotum corners, metasoma callosities, punctation, shape of the gonoforcipes. Terminalia of the males (Fig. 66): Genital capsule distally expanded, flattened and tongue-like, the penis valves distinctly shorter than the gonoforcipes; proximal lobes of S8 sclerotised, with bristles at the apex. The complete mask of the male, as well as the mask and head outline of the female are different (Fig. 17). The integument is rather shiny and more finely punctate.

Distribution. Morocco.

Hylaeus (*Paraprosopis*) *decaocto* (Warncke, 1992)

Prosopis (*Paraprosopis*) *decaocta* Warncke, 1992: 780–781, ♀. Turkey, Hakkari. Holotype OLML Linz.

Hylaeus (*Paraprosopis*) *socheri* Dathe, 2010: 61–63, ♂♀. Iran, Yazd. Holotype ♂ SDEI Müncheberg.

Hylaeus (*Paraprosopis*) *decaocto* (Warncke, 1992) – Özbek and Dathe (2020: 321).

Diagnosis. The *Hylaeus decaocto* male is conspicuous in its extensive, intense, bright yellow colouration. The females also have a complete yellow mask (Fig. 18), and their scutellum, axillae, postscutellum and mesopleura have yellow spots. On the whole, they appear wasp-like. The punctation is generally moderate to dense, to subcontiguous. Terga black and shiny, with similar punctation, the terminal margins are bright transparent and bear loose bands of cilia. Tergum 3 of males with a flat transverse tubercle. Terminalia of males (Fig. 67): Genital capsule short, in outline trapezoid, with a broad area of the penis valves visible in dorsal view.

Distribution. Turkey: Hakkari; Iran: Yazd.

Hylaeus (*Paraprosopis*) *guptai* Saini & Chandra, 2021

Hylaeus (*Paraprosopis*) *guptai* Saini & Chandra, 2021: 172–177, ♂♀. India, Arunachal Pradesh, Tawang, Jang. Holotype ♂ NZSI Kolkata.

Diagnosis. The species differs from the previously known species of the subgenus *Paraprosopis* in India, *Hylaeus gujaraticus* (Nurse, 1903) by apex of gonostylus triangular, spiculum of sternum 8 elongate (Fig. 68); paraocular mark in male reaching up to middle of the scape base;

scapes black with a tiny yellow dot at apex (Fig. 19). Male metasoma see Fig. 20, female propodeum and T1 Fig. 21. *Hylaeus guptai* is close to the Far Eastern and Chinese species *Hylaeus concinnus* Cockerell, 1924, but differs in the middle of frons densely punctate; pronotal collar without yellow mark.

Distribution. India: Arunachal Pradesh state.

Hylaeus (*Paraprosopis*) *concinnus* Cockerell, 1924

Hylaeus concinnus Cockerell, 1924: 282, ♂. Russia, Primorje, Kudja River. Holotype NHM London.

Hylaeus monostictus Cockerell, 1924: 278–279, ♀. Russia, Primorje, Preobrageniya Bay. Holotype NHM London.

Hylaeus (*Paraprosopis*) *concinnus* Cockerell, 1924 – Dathe 1986: 27, 31; Chen and Xu 2009: 40; Proshchalykin and Dathe 2012: 9, 24.

Diagnosis. A striking feature of *Hylaeus concinnus* is the smooth oval area above the scape insertion in both sexes. It can also be distinguished from *H. nigricallosus* by the shape of the head, frons and propodeum. The male has expanded black scapes, the light yellow mask is transversely truncate at the upper edge of the scape insertion (Fig. 22). Terminalia of males (Fig. 69): Genital capsule rounded-rectangular in outline; S7 with short distal lobe; S8 with broadened apical lobe, distally shallowly emarginate, without setae. The female mask consists of large triangular lateral spots and a longitudinal macula on the clypeus. In both sexes, tergum 1 is polished, only laterally with scattered minute punctation.

Distribution. Russia: Amurskaya Oblast, Primorskiy Territory; China: Jilin, Shandong, Shanghai.

Hylaeus (*Paraprosopis*) *nigrocallosus* Morawitz, 1890

Hylaeus nigrocallosus Morawitz, 1890: 383–384, ♂. China, Sichuan. Holotype ZISP St. Petersburg.

Prosopis nigricallosa (Morawitz, 1890) – Dalla Torre 1896: 25.

Hylaeus nigricallosus Morawitz, 1890 – Meade-Waldo 1923: 20; Dathe 1986: 33–34.

Hylaeus indistinctus Morawitz, 1890: 382–383, ♀. China, Gansu. Lectotype ZISP St. Petersburg.

Prosopis indistincta (Morawitz, 1890): Dalla Torre 1896: 27.

Hylaeus indistinctus Morawitz, 1890 – Meade-Waldo 1923: 20; Dathe 1986: 30–32; Dathe and Proshchalykin 2017: 23.

Hylaeus (*Paraprosopis*) *nigrocallosus* Morawitz, 1890 – Dathe and Proshchalykin 2017: 23, 30–31.

Diagnosis. A somewhat larger species of the subgenus (Fig. 23) with a very finely and densely punctured head and mesonotum, therefore appearing dull; metasoma tergum 1 smooth and shiny, with finely scattered punctation in males, without punctures in females. Propodeum sloping, medial area coarsely reticulate, terminal area roughly sculptured, without bordered ridges. Pronotum very narrow, legs black. Terminalia of males (Fig. 70): Genital capsule short and compact; S7 with smaller proximal lobes; S8 approximately rhombic, distal lobes glabrous.

Distribution. China: Sichuan, Gansu.

Hylaeus (*Paraprosopis*) *lushanicus* Dathe, 2015

Hylaeus (*Paraprosopis*) *lushanicus* Dathe, 2015: 234–235. ♀. China, Sichuan, Lushan Mt. Holotype IZCAS Beijing.

Diagnosis. *Hylaeus lushanicus* resembles *H. concinnus* in the shape of the face and its yellow markings, but it has no smooth areas above the antennae bases (Fig. 24). Propodeum rounded, with short horizontal part; medial area at its base with a row of meshes, followed by short longitudinal wrinkles which merge caudally. Tergum 1 finely striated, silkily shiny, punctation scattered, fine. The male is unknown.

Distribution. China: Sichuan.

Arabian Peninsula

Hylaeus (*Paraprosopis*) *emir* Dathe, 2000

Hylaeus (*Paraprosopis*) *emir* Dathe, 2000: 169–171, ♂. UAE, Liwa Oases. Holotype SDEI Müncheberg. – Description of ♀ in Dathe 2022: 208–209 from UAE and Oman.

Diagnosis. The species is highly conspicuous, with an extremely richly yellow, wasp-like colouration, which is unique among the *Paraprosopis* species. It is reminiscent of *Hylaeus luteobalteatus* Dours, but is smaller and less robust, with finely sculptured integument. The face is almost twice as long as broad, the malae long (Fig. 27). In females, the metasoma is even completely yellow dorsally. The scapes of males are slender; S3 to S5 of metasoma have a transverse callus. The terminalia of males (Fig. 71) appear rather conventional: genital capsule elongated in outline, rounded-rectangular, penis valves shorter than gonoforcipes; S8 with long, broadened distal lobes, deeply notched at the end and covered with short setae; S7 with large, broad distal lobes membranous, transparent, proximal lobes smaller, somewhat sclerotised.

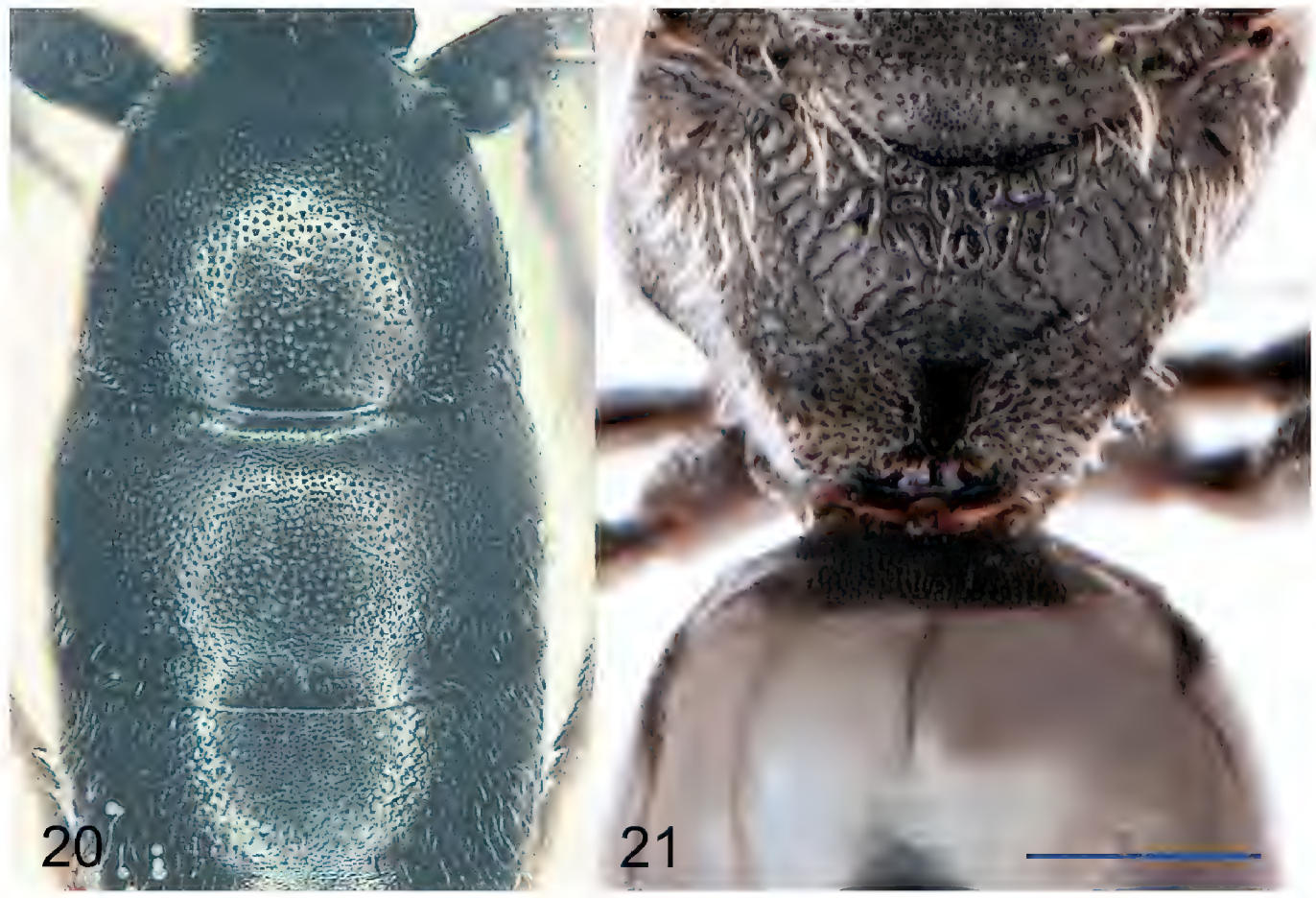
Distribution. UAE, Oman.

Hylaeus (*Paraprosopis*) *donbakeri* Dathe, 1995

Hylaeus (*Paraprosopis*) *donbakeri* Dathe, 1995: 160–161, ♂♀. UAE, Towean. Holotype ♂ SDEI Müncheberg.

Diagnosis. Among the *Paraprosopis* species in the region, the species stands out due to the coarse (females) and strong (males) punctation of the mesopleura. The trapezoidal face is short and broad (Fig. 28). The metasoma is compact, T1 is smooth and distinctly

Figures 16–19. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **16.** *H.* (*P.*) *lineolatus* (Schenck); **17.** *H.* (*P.*) *livius* (Warncke); **18.** *H.* (*P.*) *decaocto* (Warncke); **19.** *H.* (*P.*) *guptai* Saini & Chandra. Scale bar: 0.5 mm.



Figures 20, 21. *Hylaeus* (*Paraprosopis*) *guptai* Saini & Chandra. **20.** Male, metasoma; **21.** Female, propodeum and T1. Scale bar: 0.5 mm.

punctate, more so in males; other terga are impressed and paler at the end; T1 with white lateral fringes, the terminal edges with loose rows of cilia. Terminalia of males (Fig. 72): Genital capsule conspicuous in shape: short, gonoforcipes diverging, distal half with long setae on the inner side, penis valves broadly triangular in dorsal view; S8 with spiculum long and narrow, apical lobe with a somewhat constricted distal part, this surrounded by hair; S7 with elongated, truncate distal lobes, which bear fine setae at the apex, the proximal lobes smaller, rounded.

Distribution. UAE, Iran: Fars.

Hylaeus (*Paraprosopis*) *samhanicus* Dathe, 2022

Hylaeus (*Paraprosopis*) *samhanicus* Dathe, 2022: 211–212, ♂. Oman, Dhofar. Holotype SDEI Müncheberg.

Diagnosis. The face of the male converges strongly downwards, the bright yellow mask is slightly impressed at the orbits and rounded on the clypeus below; the anterior clypeus corners are broadly black, as are the labrum and mandibles (Fig. 29). The scapes are slender and circular, with a yellow longitudinal stripe. The tibiae are annulated with black. Depressions of tergites are not

Figures 22–26. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **22.** *H.* (*P.*) *concinnus* Cockerell; **23.** *H.* (*P.*) *nigrocallosus* Morawitz; **24.** *H.* (*P.*) *lushanicus* Dathe; **25.** *H.* (*P.*) *aenigmatis* Dathe; **26.** *H.* (*P.*) *taizzi* Dathe. Scale bar: 0.5 mm.

Figures 27–31. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **27.** *H.* (*P.*) *emir* Dathe; **28.** *H.* (*P.*) *donbakeri* Dathe; **29.** *H.* (*P.*) *samhanicus* Dathe; **30.** *H.* (*P.*) *azorae* (Warncke), male; **31.** *H.* (*P.*) *maderensis* (Cockerell). Scale bar: 0.5 mm.

very pronounced and hardly paler; they bear white cilia bands. Male terminalia (Fig. 73): Genital capsule with gonoforcipes black, broadly rounded, penis valves broadened, dorsal surfaces notched; S8 with narrow basal lobe, apical lobe slender, with long setae at the end, obtusely emarginate; S7 with large distal lobes, proximal lobes distinctly smaller. The female is not known.

Distribution. Oman.

Hylaeus (*Paraprosopis*) *taizzi* Dathe, 2010

Hylaeus (*Paraprosopis*) *taizzi* Dathe, 2010: 63–65, 78, ♂♀. Yemen, Taizz. Holotype ♂ SDEI Müncheberg.

Diagnosis. A very small species with a broad-oval head outline, the face strongly converging downwards, the compound eyes somewhat bulbous. Integument shagreen with dense fine punctation, only slightly shiny. Mask reduced at

the bottom, clypeus sometimes completely black. Females with a yellow median spot on the clypeus, the lateral spots shortened at the bottom (Fig. 26). In the propodeum of both sexes, the transition from the lateral areas to the terminal area is without a sharp edge. Terminalia of males (Fig. 74): Genital capsule briefly bell-shaped in outline, gonoforcipes truncate, penis valves broadened in dorsal view, with a curved surface; S8 with long spiculum, distal lobe short, paired ends tapering to a point, very sparsely bristled distally; S7 with elliptical distal lobes, proximal lobes sclerotised around lower margin, distally with fine bristles.

Distribution. Yemen.

Identification keys to species of the *Hylaeus* subgenus *Paraprosopis*

The following identification keys avoid, as far as possible, the use of male terminalia characters in order to simplify the identification process. In fact, however, verification of these characters is indispensable for reliable identification in many cases. These characters are presented in more detail in the diagnoses of the species.

Males

1	Head strikingly elongate; entire body with rich yellow markings, metasoma with yellow transverse stripes ('wasp marking')	***H.* (*P.*) *emir* Dathe, 2000**
–	Head roundish or trapezoid, not elongate; pale markings restricted to mask, pronotum, calli, tegulae and legs, metasoma black	**2**
2	Metasoma compact, S3 with transverse callosity; some with characteristic mask (Figs 15, 16)	**3**
–	Metasoma slender and spindle-shaped, ventrally without markings; mask different	**6**
3	Clypeus wholly or partly black, in particular apical; anterolateral pronotum sides acute	**4**
–	Clypeus entirely white or yellow, occasionally darkly lined at front margin; anterolateral pronotum sides rounded	**5**
4	Clypeus entirely black; face with two lateral, high set yellow-white stripes at the orbits; S3 and S4 with transverse bulge; gonoforcipes apically widened and flattened, considerably longer than the penis valves	***H.* (*P.*) *lineolatus* (Schenck, 1861)**
–	Clypeus with only lower half black, mask otherwise complete; metasoma underside flat; gonoforcipes conventional; penis valves relatively longer	***H.* (*P.*) *clypearis* (Schenck, 1853)**
5	Scapes slender, black; mask white	***H.* (*P.*) *livius* (Warncke, 1992)**
–	Scapes expanded, entirely yellow; mask yellow	***H.* (*P.*) *donbakeri* Dathe, 1995**
6	Tibia III with black ring or spot	**7**
–	Tibia III completely yellow, at most with a small brown spot on the inside	**16**

• Tibiae with black ring

7	Terminal area of the propodeum with a sharp edge, also lateral areas separated with a ridge	**8**
–	Terminal area of the propodeum not bordered, lateral areas finely sculpted and rounded, without a distal ridge	***H.* (*P.*) *samhanicus* Dathe, 2022**
8	T1 with moderate to strong punctation, often the surface matt; frons without distinct smooth areas	**10**
–	T1 punctation very fine and scattered, surface smooth and shiny; frons with two distinct polished areas at the SCA (Figs 11, 22)	**9**
9	Scape white with black margin; mask extending laterally beyond the bases of the scape; T1 shagreen with moderate sparse punctation	***H.* (*P.*) *mendibus* (Warncke, 1972)**
–	Scape black; mask with white lateral spots that only reach the bases of the scape; T1 smooth and shiny, without punctation	***H.* (*P.*) *concinnus* Cockerell, 1924**
10	T1 with moderate to strong punctation (Fig. 20), S8 with enlarged apical lobe (Fig. 68)	***H.* (*P.*) *guptai* Saini & Chandra, 2021**
–	T1 with weaker and denser punctation or, if punctation strong, S8 with broadened or significantly smaller apical lobe	**11**
11	T1 with dense to contiguous punctation; tibiae and metatarses III rich yellow, often also scapes brightly marked	**12**
–	T1 with sparse moderate punctation, surface smooth and shiny; hind legs entirely black except for a light spot on the knees and the tarses; scapes dark brown	***H.* (*P.*) *nigrocallosus* Morawitz, 1889**
12	Propodeum terminal area with sharp edges, lateral areas with transverse edge; T1 with strong punctation	**13**
–	Propodeum terminal area rounded, especially the lateral areas without a sharp edge; T1 with moderate but dense punctation	***H.* (*P.*) *taizzi* Dathe, 2010**

13	T1 with strong close to sparse punctation, intervals smooth and shiny, without shagreen	**14**
–	T1 with dense moderate punctation, intervals shagreen, matt	***H.* (*P.*) *styriacus* Förster, 1871**
14	Scape slender, only slightly wider than the antennal flagellum, usually completely black; mesopleura with moderate sparse punctation, with fine shagreen intervals	***H.* (*P.*) *pictipes* Nylander, 1852**
–	Scape expanded, almost twice as wide as antennal flagellum, white-striped; mesopleura distinctly rougher and more densely punctate, punctation strong and close to dense	**15**
15	Lateral spots above antennal sockets expanding inward (Fig. 12); scape with white edge strip, mandible black; head in outline wider than long	***H.* (*P.*) *sinuatus* (Schenck, 1853)**
–	Lateral spots above antennal sockets straight, not expanding inward (Fig. 13); scape predominantly white, mandible with white stripe; head in outline about as long as wide	***H.* (*P.*) *soror* (Pérez, 1903)**

• Legs at least from femoral tip yellow

16	Scape completely yellow; T1 finely shagreen, with fine scattered punctation	**17**
–	Scape black with bright marginal stripes; T1 smooth and shiny, patterns of punctation different	**18**
17	Frons with indistinct wrinkled punctation; apical metasomal tergite(s) with yellow transverse spot	***H.* (*P.*) *xanthopoda* (Vachal, 1895)**
–	Frons with distinct punctation; apical metasomal tergites black	***H.* (*P.*) *gujaraticus* (Nurse, 1903)**
18	T1 with fine and sparse to scattered punctation	**19**
–	T1 with strong and dense punctation	**20**
19	Small, dainty, strikingly slender species with a narrow mesosoma; face rounded, with a white mask; T1 with minute scattered punctation	***H.* (*P.*) *gribodoi* (Vachal, 1895)**
–	Species with normal habitus, mesosoma compact; face trapezoidal, with sulphur-yellow mask; T1 with fine regular punctation	***H.* (*P.*) *dinkleri* (Friese, 1898)**
20	Terminal area of propodeum with sharp margins, lateral areas also separated by a ridge; T1 with moderate dense to close punctation; end margins of terga not pale and hairy	**21**
–	Terminal area of propodeum rounded, lateral areas without distal ridges; T1 with fine subcontiguous punctation; end margins of terga paler and with white hairs	***H.* (*P.*) *decaocto* (Warncke, 1992)**
21	Head and mesosoma with long upright white hairs; wing veins yellow	***H.* (*P.*) *lactipennis* (Benoist, 1957)**
–	Head and mesosoma with short, sparse hair; wing veins dark brown	**22**
22	S7 apical lobe with shallow incision; mask sulphur yellow; legs yellow	***H.* (*P.*) *taeniolatus* Förster, 1871**
–	S7 apical lobe with deep incision; mask white; tibia III inside with small brown spot	***H.* (*P.*) *aenigmatis* Dathe, 2022**

Females

1	Scutellum, postscutellum and axillae black with yellow markings	**2**
–	Scutellum, postscutellum and axillae black	**3**
2	Propodeum and metasoma black with yellow markings	***H.* (*P.*) *emir* Dathe, 2000**
–	Propodeum and metasoma black	***H.* (*P.*) *decaocto* (Warncke, 1992)**
3	Scapes yellow spotted or all yellow, T1 shagreen, without punctation	**4**
–	Scapes black, T1 different	**5**
4	Mask completely yellow	***H.* (*P.*) *gribodoi* (Vachal, 1895)**
–	Mask incomplete, pattern characteristic; clypeus only spotted	***H.* (*P.*) *xanthopoda* (Vachal, 1895)**
5	Clypeus with distinct yellow spot	**6**
–	Clypeus black, occasionally with a small pale spot	**10**

• Clypeus with yellow spot

6	Scapes black	**7**
–	Scapes black with yellow longitudinal stripe	***H.* (*P.*) *donbakeri* Dathe, 1995**
7	Propodeum rounded with finer wrinkles, terminal area not completely surrounded by a rim	**8**
–	Propodeum with coarse reticulated wrinkles, terminal area completely surrounded by a sharply defined rim	**9**
8	Propodeum medial area reticulate over entire surface, laterally with fine margin; face strongly converging downwards, with long lateral spots extending far beyond the antennal bases	***H.* (*P.*) *taizzi* Dathe, 2010**
–	Propodeum medial area only basally reticulate, laterally without margin; face slightly converging downwards, lateral spots short, ending next to the antennal bases	***H.* (*P.*) *lushanicus* Dathe, 2015**

9 Femora yellow, T1 polished with scattered microscopically fine punctation, frons with shagreen supra-antennal area ***H.* (*P.*) *dinkleri* (Friese, 1898)**
– Femora black, T1 polished, without punctation, frons with shiny supra-antennal surfaces ***H.* (*P.*) *concinnus* Cockerell, 1924**

• Clypeus black

10 Head long, trapezoidal; facial lateral spots linear, adjoining orbits along their length ***H.* (*P.*) *lineolatus* (Schenck, 1861)**
– Head transverse or roundish; lateral spots punctiform to triangular, sometimes filling the paraocular areas **11**
11 Lateral pronotum edges pointed; T1 with close punctation; paraocular area with a triangular spot **12**
– Lateral pronotum edges rounded; T1 shagreen or with scattered punctation, paraocular marking different **13**
12 T1 with close to dense punctation, without shagreen interspaces; clypeus always completely black; mandibles three-toothed ***H.* (*P.*) *clypearis* (Schenck, 1853)**
– T1 shagreen with close punctation, interspaces shagreen; clypeus often with small pale spot; mandibles bluntly truncate apically ***H.* (*P.*) *livius* (Warncke, 1992)**
13 Legs yellow or yellow-white distally from the tip of femora **14**
– Legs predominantly black, at most femora completely yellow **15**

• Legs from femoral tip yellow

14 Stigma and veins of wings dark brown; paraocular fleck reaching far onto the frons; T1 finely shagreen, without punctation ***H.* (*P.*) *gujaraticus* (Nurse, 1903)**
– Stigma and veins of wings yellow; paraocular fleck small, reaching up only to the base of scape; T1 polished, with minute sparse punctation ***H.* (*P.*) *lactipennis* (Benoist, 1957)**

• Legs predominantly black

15 T1 finely shagreen, with scattered fine punctation, silkily shiny; clypeus black or with white spot **16**
– T1 smooth and shiny, with coarser punctation; clypeus black or with yellow spot **17**
16 Very small species, TL approx. 4.5 mm; facial outline almost circular, malae narrow; mesonotum subcontiguously punctate, dull ***H.* (*P.*) *styriacus* Förster, 1871**
– Larger species, TL approx. 6 mm; facial outline trapezoidal, malae about half as long as broad; mesonotum closely punctate, shiny ***H.* (*P.*) *mendibus* (Warncke, 1972)**
17 Propodeum with pronounced reticulated wrinkles, terminal area surrounded by sharp edge **18**
– Propodeum rounded and with fine sculpture, only medial area with weak longitudinal wrinkles, without bordered terminal area ***H.* (*P.*) *nigrocallosus* Morawitz, 1889**
18 Mesopleura with shallow fine sparse punctation on finely shagreen surface; silkily shiny **19**
– Mesopleura with moderate close punctation; glossy **21**
19 Richly marked with light yellow: tibiae mostly completely yellow, lateral spots fully developed, clypeus often with spot, pronotum with band ***H.* (*P.*) *taeniolatus* Förster, 1871**
– Bright colouration less expanded: tibiae predominantly black; usually lateral spots abbreviated above and below, clypeus black, pronotum with two short stripes or black **20**
20 T1 with fine close punctation, silkily shiny; pronotal lobe with yellow spots; paraocular marking large, reaching upto antennal socket (Fig. 4) ***H.* (*P.*) *pictipes* Nylander, 1852**
– T1 with sparse punctation (Fig. 21), smooth and shiny; pronotal lobe black; paraocular marking smaller, not touching antennal socket (Fig. 19) ***H.* (*P.*) *guptai* Saini & Chandra, 2021**
21 Head shorter, wider than long; lateral spots truncate at top and bottom; clypeus without spot; T1 with fine sparse punctation ***H.* (*P.*) *sinuatus* (Schenck, 1853)**
– Head longer, hardly wider than long; lateral spots often fully developed; clypeus sometimes with spot; T1 with minute scattered punctation ***H.* (*P.*) *soror* (Pérez, 1903)**

Atlantic Islands

The islands of the eastern Atlantic and near North Africa are zoogeographically considered part of the Palaearctic, while the neighbouring African mainland is part of the Afrotropical region. All the endemic *Hylaeus* species of the archipelagos of the Azores, Madeira and the Canary Islands belong to *Paraprosopis*, and although the Canary Islands are located near the West African coast, no species of *Paraprosopis* have been recorded

on the mainland to date. However, this area has not yet been well explored, so there may still be surprises. Only one species is known from the Azores and one from the Madeira archipelago, while the present study doubles the number of endemic species in the Canary Islands from three to six.

Several other *Paraprosopis* species have also been found on the Atlantic islands, such as *Hylaeus taeniolatus* from Tenerife (Sta. Cruz) and *H. pictipes* from Porto Santo (Madeira archipelago). However, they were probably introduced; only a single specimen of each species was hitherto recorded (Dathe 1993, Kratochwil and Schwabe 2018). No *Hylaeus* species have been reported from the southernmost archipelago, Cape Verde.

Hylaeus (*Paraprosopis*) *ater* (Saunders, 1903)

Prosopis atra Saunders, 1903: 212–213, ♀♂. Spain, Canary Islands, Tenerife. Syntypes NHM London.

Prosopis (*Paraprosopis*) *pictipes atra* Saunders, 1903 – Warncke 1972: 749.

Hylaeus (*Paraprosopis*) *ater* (Saunders, 1903) – Dathe 1993: 748.

Diagnosis. Body length 4.4–6.1 mm in males, 5.5–5.8 mm in females. The species is unique in the archipelago in having a sharp edge between vertex and occiput in males and females (Fig. 39). Pronotum often bulged. T1 laterally with narrow white ciliary fringes. Face in females mostly black, sometimes with yellow side spots. Mask of males yellow; side spots, if lengthened upwards, tapering to orbits (Fig. 32). At least tibia 1 of male with white stripe. Mesosoma with moderate punctation, slightly shiny. Terminalia are clearly distinguished by the long distal part of apical lobe of S7 (Fig. 75).

Distribution. Canary Islands: Tenerife.

Remark. The illustration by Méhelÿ (1935: 159, tab. XXXII) for a male from El Hierro is not clearly assignable. The data for Tenerife in Dathe (1993: 748) are confirmed here; the further reports for El Hierro and La Gomera refer to *H. hierro* and *H. gomerensis* respectively.

Hylaeus (*Paraprosopis*) *canariensis* Erlandsson, 1983

Hylaeus (*Paraprosopis*) *canariensis* Erlandsson, 1983: 115–116, ♀♂. Spain, Canary Islands, Tenerife. Holotype ♀ NHRM Stockholm.

Diagnosis. The smallest species of *Paraprosopis* on the archipelago, at 4–5 mm long. Males and females relatively richly coloured: only in this species are the legs brightly ringed, tibiae and basitarsi 3 with ivory-white ring. Faces Fig. 33. Medial area of propodeum finely sculptured, narrow area at its base with wrinkles. Male terminalia see Fig. 76. So far nearly only records from above 1000 m altitude have been confirmed.

Distribution. Canary Islands: Tenerife.

Hylaeus (*Paraprosopis*) *hohmanni* Dathe, 1993

Hylaeus (*Paraprosopis*) *hohmanni* Dathe, 1993: 749–751, ♂♀. Spain, Canary Islands, Tenerife. Holotype ♂ MICN Tenerife.

Diagnosis. Body length 4.6–6.3 mm in males, 5.1–6.8 mm in females. T1 without fringes, shiny, with fine and scattered punctation. Mesosoma densely shagreen and punctate, dull. On Lanzarote, integument also shiny. Females sometimes with lateral whitish face spots (Fig. 34). In males tibia 1 and 2 with white stripes, tibia 3 occasionally with white spot. Parts of apical lobes of S7 clearly shorter. Maxillary palps long, in males longer than flagellomeres 1–4, in females longer than flagellomeres 1–5. Terminalia Fig. 79.

Distribution. Canary Islands: La Palma, La Gomera, Tenerife, Gran Canaria, Fuerteventura, Lanzarote.

Hylaeus (*Paraprosopis*) *gomerensis* Haeseler, sp. nov.

https://zoobank.org/2454928E-5FE0-464A-B600-E4A64EA9641F

Diagnosis. Integument shiny, especially scutellum and head. Depression of T1 with lateral ciliar bands. Females seldom with small face spots. In males, tibia 1 with yellowish stripe, tibia 2 sometimes striped. Compared to *Hylaeus hierro*, the maxillary palps short, in males and females shorter than flagellomeres 1–5. Female with cluster of white hairs over each antennal socket. Omaulus above episternal groove bulging. Supraclypeal area abruptly set up from the frons. Mask of male yellow, paraocular patches rarely lengthened beyond the antennal base. Unlike *H. hierro*, without black stripe between clypeus and paraocular area. In contrast to *H. ater*, boundary between vertex and occiput rounded, and the parts of the apical lobes of S7 are about the same length.

Distribution. Canary Islands: La Gomera.

Description. Male. N = 29. TL 4.2–6.0 mm. Head. HL:HW 0.82–0.88 (0.86), UFW:LFW 1.81–2.13 (1.92). Colouration: antennae black, flagellum ventrally brownish, flagellomeres 1 and 11 often half black. Setae on frons and vertex brownish-white, twice as long as on clypeus, longest hairs as long as spur of tibia 2. Scapes dorsally with hairs as long as spur of tibiae 2. Mask yellow, paraocular patches terminating at lower level of antennal sockets, rarely tapering to orbit, isolated lengthened stripes or dots [6/29], epistomal suture and anterior tentorial pit unobtrusive (Fig. 36A), clypeus apically brownish. Upper part of supraclypeal area raised, at tip abruptly truncate, divided by a deep groove. Behind notch deepening, not reaching the medial ocellus. Above antennal socket, the parts next to the groove area each without punctation, dull. Sculpture: frons densely punctate, increasing to orbits. Boundary between vertex and occiput rounded, with moderate punctation changing to shagreen. Mask sparse and strongly punctate. Genae next to orbits punctate, changing into fine

Figures 32–35. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **32.** *H.* (*P.*) *ater* (Saunders); **33.** *H.* (*P.*) *canariensis* Erlandsson; **34.** *H.* (*P.*) *hohmanni* Dathe; **35.** *H.* (*P.*) *yasumatsui* Snelling. Scale bar: 0.5 mm.

striation towards hypostoma. Malae as narrow as width of apical maxillary palpomeres. Labrum and mandibles black, labrum also with yellow spot [7/29]. Maxillary palps short, as long as flagellomeres 1–5 or shorter: MP:FS(1–5) 0.74–0.88 (0.79).

Mesosoma (Fig. 36B). Colouration black, calli and tegulae sometimes brownish. Pilosity brownish white, longest scattered hairs of mesonotum as long as inner spur of tibiae 3, shorter dense pilosity 2/3 as long as longest hairs, towards metanotum even shorter, hairs on pleura und propodeum shorter, medial area of propodeum and medial furrow without hairs. Pronotum lateral edge rounded. Integument shiny, especially scutellum shiny, punctation rather dispersed, shagreen hardly visible. Metanotum moderately sculptured, dull, laterally with single punctures. Omaulus above lower end of episternal groove bulging, furrow ending with transverse ridge (Fig. 41). Mesopleura shagreen with moderate and dense punctation, shiny, upper area of metepisternum with shiny transverse ridges, lower part with minute ridges and minute dense punctation. Legs: tibiae 1 with conspicuous yellowish stripes, tibiae 2 frequently with yellowish stripes [14/29], indistinctly yellowish spotted [8/29] or black [7/29], tibiae 3 mostly black, rarely also with spot [9/29], spurs whitish. Alae hyaline, veins brown. Lower lateral part of propodeum with moderate to strong punctation, shiny, upper area with diminishing punctation, irregularly sculptured, dull. Lower half of posterior surface of propodeum with lateral carinae; lateral areae to posterior surface rounded or sometimes with weak rudimentary carinae; medial area separated from lateral areae by carinae, approaching on the upper part of posterior surface a small shiny groove extending to the propodeal pit; medial area with striae reaching to base and sides, posteriorly rounded surface of medial area shagreen.

Metasoma (Fig. 36C). Colouration black. Depressions paler from T2; terga shagreen and punctate, decreasing to base of T1 laterally and distally, interspaces between punctures sparse, depressions of terga finely shagreen and shiny, T1 laterally with distal groups of short hairs. Shagreen of sterna finer than on terga, shiny, punctation of middle parts stronger than on terga. S6 lengthened in the middle. S7 (Fig. 77): Distal part of apical lobes longer than proximal part by 1.15–1.3 (1.19).

Female. N = 48, TL 4.8–6.1 mm. Head. HL:HW 0.77–0.87 (0.84), UFW:LFW 1.45–1.57 (1.54). Colouration black, sporadically with small yellowish spots on paraocular areae [7/48]. Antennae black, flagellum ventrally brownish, antennomeres 1 and 10 often half black. Mandibles apically often paler (brownish). Pilosity: brownish hairs on frons and vertex as long as spur of tibiae 2; pilosity on clypeus short, apical edge with row of longer hairs; above antennal socket aggregation of dense white hairs, half as long as longest hairs on vertex; dorsal pilosity of scapes as long as scape width. Sculpture: foveae faciales converging halfway distant between ocelli and orbits. Frons and vertex with fine and dense punctation, decreasing towards ocelli and orbits, interspaces shiny, distal area of vertex with increasing shagreen; clypeus and supraclypeal area shagreen with moderate scattered punctation. Boundary between vertex and occiput rounded. Supraclypeal area distally ending abruptly and sometimes grooved (Fig. 36D), medial furrow not reaching middle ocellus. Malae narrow. Labrum with thickening and longer brownish hairs. Maxillary palps shorter than flagellomeres1–5: MP:FS(1–5) 0.73–0.87 (0.80).

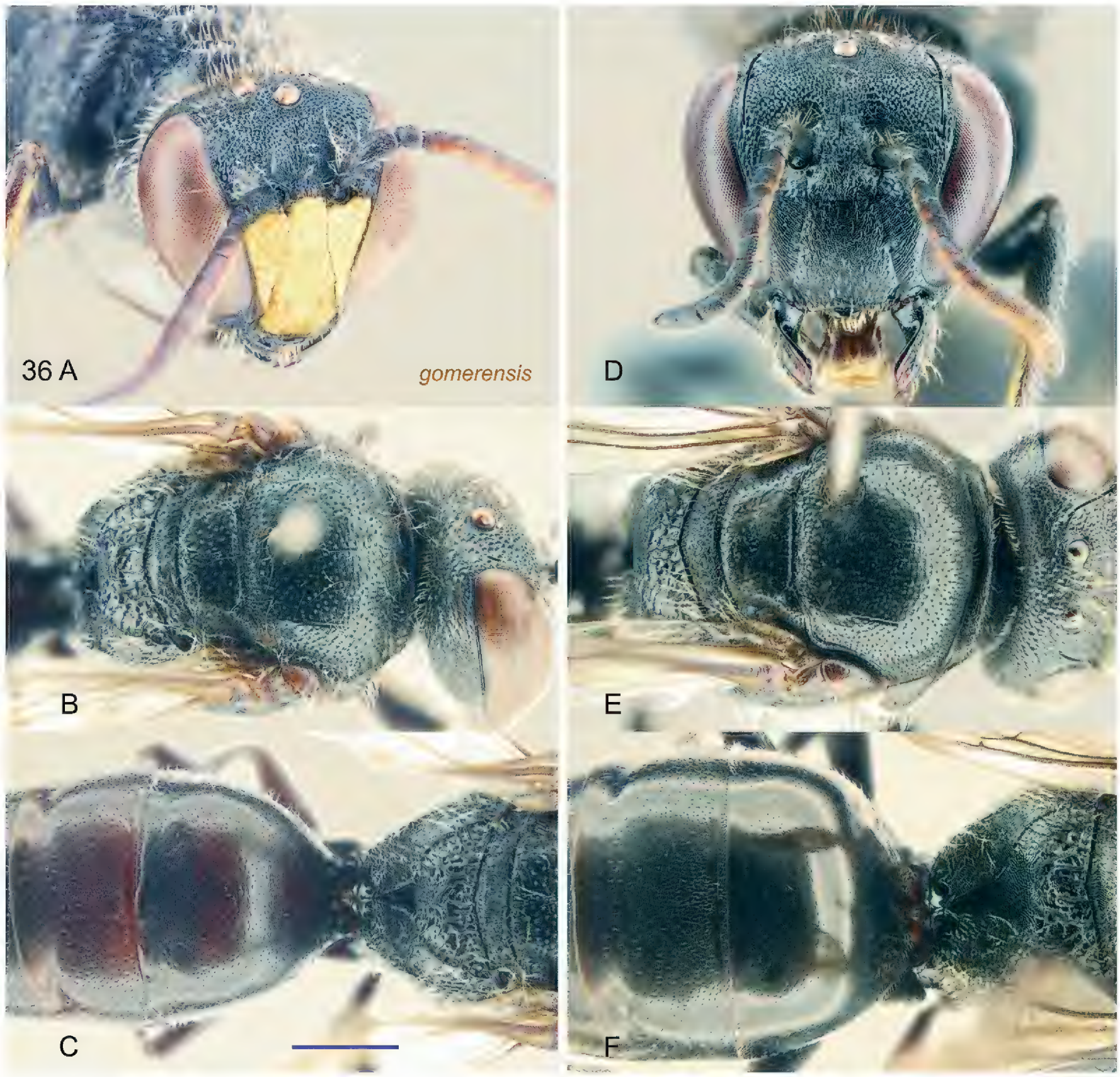


Figure 36. *Hylaeus* (*Paraprosopis*) *gomerensis* Haeseler, sp. nov. **A–C** Male; **D–F** Female; **A, D** Head, **B, E** Mesosoma and **C, F** Propodeum and metasoma, dorsal view. Scale bar: 0.5 mm.

Mesosoma (Fig. 36E). Colouration black, including calli and tegulae. The integument is shiny, especially large areas of the mesonotum and scutellum; the scutellum often not clearly shagreen. Pilosity: hairs of mesonotum and metanotum brownish white, as long as spur of tibiae 2, dense pilosity about 1/6 as long as scattered long pilosity, pleura and propodeum with short white pilosity, medial area of propodeum and medial furrow without hairs. Episternal groove ending with transverse ridge, omaulus above lower end of episternal groove bulged. Pleura shagreen with sparse moderate and dense fine punctation, shiny. Legs black, knees often paler (brownish), spurs whitish. Alae hyaline, veins brown. Propodeum as in male, but lateral areae to medial surface of propodeum only sometimes with weak carinae.

Metasoma (Fig. 36F). Terga: T1 slightly shagreen with minute to fine scattered punctation, shiny, distally with lateral ciliar bands; following terga shagreen with fine dense punctation; depressions of terga distally without punctation, often paler. Sterna finely shagreen, shiny, middle areae more strongly punctate than terga.

Type material. ***Holotype*** SPAIN • ♂, Islas Canarias, La Gomera, Eremita San Lorenzo, 4 km SE Chipude, 24.III.2014, V. Haeseler leg.; coll. SDEI. – ***Paratypes*** SPAIN • 18 ♂, 15 ♀, same data as for holotype, 24–25.III.2014; in coll. UMB, MICN, SDEI, coll. Haeseler.

Further studied material. SPAIN • Islas Canarias, La Gomera: 1 ♂, Mirador de C. Manrique, 3 km N Valle Gran Rey, 17.III.2014, 2 ♂, same locality, 21.III.2014; 5 ♂, 2 ♀, Arure, 3 km N Valle Gran Rey, 18–20.III.2014; 13 ♀, Eremita San Lorenzo, 4 km SE Chipude, 13.IV.2024, 11 ♀, same locality, 15.IV.2024; 1 ♂, 4 ♀, 2 km W San Sebastian, 26.III.2014; 1 ♂, El Cercado, 6 km NE Valle Gran Rey, 800 m alt., 10.V.2018, 1 ♀, same locality, 13.IV.2019; 2 ♀, Mirador de Igulero, 3 km ESE Chipude, 15.IV.2024.

Flower visits. *Echium plantagineum*, *Euphorbia balsamifera.*

Derivatio nominis. The species is named after its place of origin, the Canary Island of La Gomera.

***Hylaeus* (*Paraprosopis*) *hierro* Haeseler, sp. nov.**

https://zoobank.org/F5022A0B-F918-49ED-BE26-B0AC9D5C8416

Diagnosis. Integument shiny. Females completely black, only flagellum ventrally brownish. Boundary between vertex and occiput rounded. Lateral depressions of T1 with ciliar bands. In males, tibiae 1 with yellowish stripe. As in *Hylaeus gomerensis*, mask of male yellow, but with striking black stripe between clypeus and paraocular area; in contrast to *H. gomerensis*, omaulus above episternal groove only slightly thickened, female without conspicuous cluster of hairs above antennal sockets, supraclypeal area dorsally not abruptly sloped or grooved. Maxillary palps longer than flagellomeres 1–5. In contrast to *H. ater*, boundary of vertex to occiput rounded, S7 with shorter distal part of apical lobes.

Distribution. Canary Islands: El Hierro.

Description. Male. N = 38, TL 5.1–6.1 mm. Head. HL:HW 0.83–0.91 (0.86), UFW:LFW 1.70–2.15 (1.89). Mask: colouration of supraclypeal area, clypeus and paraocular areae light yellow to middle of antennal sockets; an expanded black stripe between clypeus and paraocular area from anterior tentorial pit to malar area, seldom [2/38] with black line; paraocular spots beginning distinctly higher than basal edges of clypeus (Fig. 37A); if paraocular spots lengthened in direction of vertex [15/38], not longer than upper level of antennal sockets and not tapering to orbits. Pilosity of clypeus, genae and frons half as long as the longest protruding hairs on vertex, these as long as spur of tibiae 2. Scapes dorsally with pilosity as long as width of scape. Scapes distally twice as broad as its base; pedicellus distally often brownish; flagellum ventrally brown, flagellomeres 1 and 11 often half black. Sculpture: moderate punctation on paraocular areae and clypeus closely punctate, supraclypeal area scattered punctate. Frons, vertex and genae with fine dense punctation, interspaces shiny, especially towards orbits. Foveae faciales, if distinct, ending on distal area of orbits, closer to orbits than to ocelli. Supraclypeal area distally gradually flattened, with distinct groove tapering to central ocellus, distal area not distinctly divided by groove. Boundary between vertex and occiput rounded. Malae as small as apical maxillary palpomere. Labrum centrally thickened, with long whitish-brown hairs and sometimes a yellow spot [2/38]. Mandibles black. Maxillary palps as long as flagellomeres 1–5 or longer: MP:FS(1–5) 0.96–1.05 (0.99).

Mesosoma (Fig. 37B). Colouration black. Pilosity whitish-brown, longest hairs on mesonotum, scutellum and metanotum as long as on frons, propodeum laterally with shorter hairs, medial area and median groove of propodeum without pilosity. Integument shiny. Mesonotum with dense to close moderate punctation and shagreen; less shagreen towards scutellum and more shiny; scutellum with moderate, scattered punctation and shiny, shagreen often not distinct. Metanotum dull, laterally with single moderate punctures. Pronotum with dorsolateral angle rounded. Mesopleura: in small males, omaulus often only weakly bulged above lower end of episternal groove. Mesopleura shagreen with moderate, dense punctation, shiny; upper part of metepisternum with shiny transverse ridges, lower part more dull and with minute and dense punctation. Sterna shiny, shagreen. Legs black, only tibiae 1 in front clearly yellowish-striped [38/38] and knees indistinctly spotted [9/38], tibiae 2 indistinctly spotted [15/38], knees indistinctly spotted [1/38], legs 3 black. Spurs white or brownish-white. Tarsi often brownish. Alae hyaline, veins brown. Propodeum laterally irregularly sculptured with moderate and close punctation, lower part shiny, upper part dull; lower half of terminal area laterally margined, with carina. Lateral areae to terminal area rounded. Posterior surfaces shagreen, basal zone reticulately ridged to the sides and to terminal area, in the middle often slightly deepened, medial area enclosed by carinae, meeting in the upper area of posterior surface of propodeum, extending as small dull groove downwards to the propodeal pit.

Metasoma (Fig. 37C). T1 on depression laterally with ciliar bands, all terga shagreen, depressions of terga shiny, punctation of T1 moderate and sparse, decreasing to shagreen depression; following terga more densely punctate, depressions nearly without punctation. Sterna shiny, in the middle area punctation scattered and stronger than on T1. S7: in fresh condition (Fig. 78) distal and proximal part of apical lobe similarly long, distal:proximal lobe: 1.08–1.10 (1.09).

Female. N = 32, TL 4.7–6.3 mm. Head. HL:HW 0.87–0.89 (0.88), UFW:LFW 1.51–1.57 (1.53). Colouration black. Sculpture: punctation on frons fine and dense, increasing towards inner orbits, interspaces shiny. Small section above each antennal socket impunctate, minutely striped. Boundary between vertex and occiput rounded, punctation of ocellar-occipital area reduced, shagreen. Pilosity brownish-white, frons and vertex with hairs of two lengths: some hairs as long as spur of tibia 2, shorter hairs half the length of these. Pilosity on clypeus distinctly shorter. Dorsal hairs on scapes half as long as width of scapes. White aggregations of short hairs above antennal sockets, these hairs scarcely longer than hairs of scapes. Foveae faciales converging halfway between ocelli and orbit. Boundary between vertex and occiput rounded. Supraclypeal area apically flattened, not bifurcated by shiny groove (Fig. 37D), small, notched groove mostly not reaching central ocellus. Malae as small as apical maxillary palpomere. Mandibles black. Labrum with small semicircular thickening. Maxillary palps as long as flagellomeres 1–5 or longer, MP:FS(1–5) 1.00–1.16 (1.06).

Mesosoma (Fig. 37E). Colouration black, calli and tegulae often brownish. Dorsally with sparse long white pilosity, as long as spur of tibiae 2, and dense short white pilosity laterally and on propodeum. Without hairs on medial area and terminal furrow of propodeum. Mesonotum shagreen with moderate, dense punctation; decreasingly shagreen on distal half and shinier than on anterior half. Scutellum mostly shiny, with moderate and sparse punctation. Metanotum dull, only laterally with single moderate and dense points. Mesopleura shagreen, with moderate and close punctation. Upper part of metepisternum

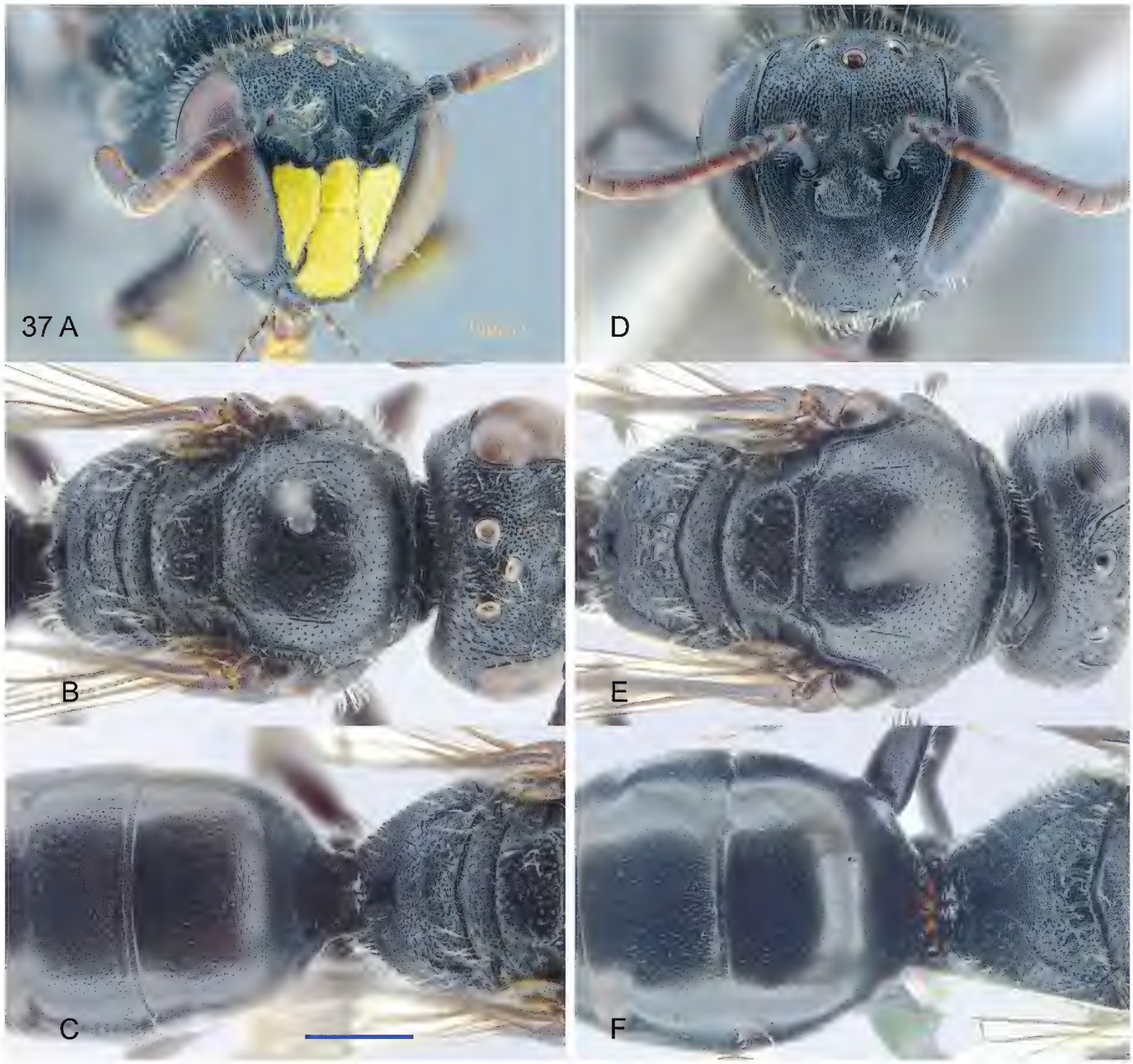


Figure 37. *Hylaeus* (*Paraprosopis*) *hierro* Haeseler, sp. nov. **A–C** Male; **D–F** Female; **A, D** Head, **B, E** Mesosoma and **C, F** Propodeum and metasoma, dorsal view. Scale bar: 0.5 mm.

transversely striated, lower part finely and densely punctate and striated, shiny. Episternal groove ending with small transverse ridge, omaulus above lower end of episternal groove weakly thickened. Legs black, only spurs white, tarsi often brownish. Alae hyaline, veins black. Propodeum: lower part of lateral areae with indistinct punctation, shiny, upper part irregularly sculptured, dull. Medial area in the middle often slightly depressed, with ridges sometimes reaching to sides, only weakly impressed lines enclose the propodeal triangle, these lines often closer in upper part of posterior surface, reaching as shagreen groove the propodeal pit, boundary between lateral areae and posterior surface rounded, rarely with vestiges of carina.

Metasoma (Fig. 37F). Colouration black, depressions from T2 on brownish. Depression on T1 laterally with ciliar bands, weakly shagreen, shiny; T2 and following terga weakly shagreen. Minute to fine punctation of T1 scattered, on following terga close, on T2 twice as dense as on T1, declining to distal edges, punctation of T1 depression scattered, following depressions shiny, without punctation. Sterna basally transversely shagreen, median areae with moderate sparse punctation, shagreen receding distally, depressions shiny.

Type material. ***Holotype*** SPAIN • ♂, Islas Canarias, El Hierro, Montaña de los Muertos, 3 km NW La Restinga, 10.IV.2015. V. Haeseler leg., coll. SDEI. – ***Paratypes*** SPAIN • 8 ♂, same data as for holotype, 8 ♂, 2 ♀, 14.IV.2015; 6 ♂, 11 ♀, Valverde, 16.IV.2015; 6 ♀, La Frontera, Tigaday, 8.V.2016; all V. Haeseler leg.; in coll. UMB, MICN, SDEI, coll. Haeseler.

Further studied material. SPAIN • Islas Canarias, El Hierro: 2 ♂, 3 ♀, Arenas Blancas, 3 km WNW Sabinosa, 12–13.IV.2015; 4 ♂, 1 ♀, La Frontera, Tigaday, 13.IV.2015, 1 ♀, same locality, 1.V.2016, 3 ♀, 13.V.2016; 2 ♂, Guinea, 2 km S Las Puntas, 15.IV.2015; 2 ♂, Eremita Virgen de los Reyes, 3 km SW Sabinosa, 600 m, 17.IV.2015; 1 ♂, La Maceta, 2 km W Las Puntas, 18.IV.2015; 4 ♂, 5 ♀, El Pinar, 6 km N La Restinga, 600 m, 21.IV.2015.

Flower visits. *Echium plantagineum*, *Euphorbia balsamifera*.

Derivatio nominis. The species is named after its place of origin, the Canary Island of El Hierro.

Hylaeus (*Paraprosopis*) *palmensis* Haeseler, sp. nov.

https://zoobank.org/4F02E297-7B1A-4E04-8916-8B76E5BD14A7

Diagnosis. Integument shiny. Females clearly distinguished by white face spots and striking white fringes of T1. Distal depression of T2 laterally with ciliar bands. Maxillary palps shorter or as long as flagellomeres 1–5. Males are characterized by the white mask and white fringes on T1. Tibiae 1 with white stripe, tibiae 2 sometimes with white stripe. Omaulus rounded in males and females. Boundary between vertex and occiput. Median furrow of propodeum shiny.

Distribution. Canary Islands: La Palma.

Description. Male. N = 92, TL 4.8–5.8 mm. Head. HL:HW 0.84–0.91 (0.88), UFW:LFW 1.79–1.99 (1.89). Colouration: Antennae except the ventral part of flagellum black; pedicellus and apical flagellomere rarely completely black. Hairs white to brownish; dense dorsal pilosity of scapes as long as width of scape, pilosity below antennal sockets half the length of pilosity above antennal sockets, single hairs on vertex as long as spur of tibiae 2. Mask (Fig. 38A): White colouration of clypeus and paraocular areae quite uniform, flecks of paraocular areae mostly starting distinctly higher than the lower edge of clypeus, terminating at lower level of antennal sockets, often with middle tip reaching upper level of antennal socket or beyond it [71/92], paraocular patches rarely start first at anterior tentorial pit. Pale colouration of supraclypeal area strongly reduced, consisting sometimes only of two little white spots [15/92], or totally black [6/92]. Anterior tentorial and epistomal pits not conspicuous. Supraclypeal area distally flattened and tapering, with shiny groove reaching the central ocellus. Paraocular areae distally moderately and densely punctate; frons above paraocular areae with fine to moderate and dense punctation, interspaces shiny; vertex not distinctly punctate, boundary to occiput rounded. Genae next to orbits with fine and dense punctation, changing to fine striation towards hypostoma. Malae narrow. Labrum with semicircular thickening and brownish hairs. Mandibles totally black or apically brownish. Maxillary palps shorter than flagellomeres 1–5: MP:FS(1–5) 0.80–0.95 (0.90).

Mesosoma (Fig. 38B). Colouration black, calli occasionally with white dot or spot [9/92], or calli occasionally brownish [4/92]. Pilosity: mesonotum with long white upper pilosity, lower pilosity especially dense, not as short as that of females. Pronotum laterally broadening and rounded. Mesonotum with moderate, dense to close punctation, weakly shagreen, shiny. Scutellum with moderate close punctation, shiny. Sculpture of metanotum wrinkled with single moderate punctures, dull. Mesopleura (Fig. 42) moderately and closely punctate, above scrobal groove with fine and close punctation, shagreen to middle of sternum striate; shagreen increasing towards rounded omaulus, towards sternum decreasingly fine and sparse punctation, shagreen towards middle of sternum striated; upper part of metepisternum transversely striated and shiny, lower part with fine striation and punctation. Legs black, tibiae 1 always white-striped, tibiae 2 frequently white-striped [62/92], tibiae 3 seldom white striped [16/92], partly only a brownish white dot. Alae hyaline, venation black. Propodeum: Inferior half of terminal area margined laterally by carina, lateral areae towards terminal area rounded, medial area separated by carinae, joining behind the horizontal area of medial area with a more or less broad, shiny groove, ending at base of terminal area. Medial area reticulately striped, towards terminal area with distinct shagreen.

Metasoma (Fig. 38C). Colouration black. T1 with white lateral fringes, each depression on T2 and 3 laterally brightened and with a row of hairs; all terga shagreen, T1 less shagreen at the base. Punctation of T1 fine and dense, laterally and distally less dense and shiny, distal area of T1 depression between fringes impunctate, sparsely shagreen. Following terga with minute, dense punctation. Sterna distally brownish, depressions shiny, punctation on the middle part of sterna moderate and dense, shagreen transverse, distal pilosity clear. Terminalia (Fig. 80), S7 with distal and proximal lobes of apical lobe similarly long.

Female. N = 50, TL 5.0–6.3 mm. Head (Fig. 38D). HL:HW 0.82–0.93 (0.87), UFW:LFW 1.49–1.59 (1.54). Colouration black. Laterally white face marks, towards vertex with point [7/50], oval [30/50] or round and distinctly smaller than antennal socket [13/50]. Clypeus seldom with white spot. Flagellomeres 2–10 ventrally brown, often 2 basally and 10 apically black. White pilosity to vertex getting longer, longest hairs as long as spur of tibia 2. Aggregations of short white hairs above antennal sockets not longer than half of width of scape. Clypeus with scattered hairs half the width of scape. Supraclypeal area rising to the middle of antennal sockets, then without interruption flattening and tapering, shiny groove distally slightly notched and not always reaching the median ocellus. Foveae faciales converging halfway between ocelli and orbits. Boundary between vertex and occiput rounded. Frons below the lateral marks striped to base of clypeus, clypeus and supraclypeal area with minute to fine and close punctation, towards labrum striated shagreen, laterally with more moderate and denser punctation as on frons; interspaces small and shiny. Vertex with fine close punctation, shiny. Genae sculptured as in male. Malae narrow. Labrum with small semicircular thickening. Mandibles black. Maxillary palps as long as flagellomeres 1–5: MP:FS(1–5) 0.97–1.03 (1.01).

Mesosoma (Fig. 38E). Colouration black. Calli often with white spot [16/50], or half white [12/50], or with merely a spot [22/50], or calli and tegulae brownish. Pilosity especially on mesonotum diverse; long, weakly brownish, sparse pilosity as long as spur of T2, about 6 times as long as dense inferior pilosity. Pilosity on distal area shorter than on mesonotum, on lateral propodeum a half shorter, medial area without pilosity. Episternal groove ending without ridge, omaulus rounded.

Figure 38. *Hylaeus* (*Paraprosopis*) *palmensis* Haeseler, sp. nov. **A–C** Male, **D–F** Female; **A, D** Head, **B, E** Mesosoma and **C, F** Propodeum and metasoma, dorsal view. Scale bar: 0.5 mm.

Mesopleura shagreen with moderate, sparse punctation, shiny; upper part of metepisternum transversely striated, lower part finely and densely punctate and striated, shiny. Mesonotum shagreen, moderately and densely punctate. Scutellum with moderate and close punctation, shiny. Metanotum shagreen with moderate and sparse punctation, dull. Legs black, all knees or only one pair of knees white [25/50]. Tibiae 1–3 white-striped in one specimen, in another specimen only tibia 1 white-striped. Often tarsi brownish. Alae hyaline, veins and bases brownish. Propodeum laterally strongly and densely punctate, shiny; medial area to lateral areae separated by a shiny groove, tapering to base of terminal area; sculpture of medial area variable: often reticulate-striped to metanotum, but sometimes with ribs parallel to metanotum, terminal area to posterior surface of propodeum shagreen; lateral areae towards terminal area rounded, terminal area separated laterally maximally up to the middle by carina.

Metasoma (Fig. 38F). Colouration black. Distal depressions frequently paler from T2 on; T1 laterally with dense white fringes, T2 laterally with row(s) of hairs (up to 30 hairs). All terga shagreen with minute to fine and close punctation, on T1 fine to moderate and dense punctation, shiny, only decreasing towards base of T1; depression distally sparsely shagreen and shiny, distal stripe of depression between fringes impunctate. Sterna distally brownish, depressions shiny, punctation stronger and closer than on terga, shagreen transverse, distal pilosity clear.

Type material. ***Holotype*** SPAIN • ♂, Islas Canarias, La Palma, Las Nieves, 16.IV.2003, V. Haeseler leg., coll. SDEI. – ***Paratypes***: SPAIN • 5 ♂, 2 ♀, Las Nieves, 15.IV.2003, 4 ♂, same locality as for holotype,

16.IV.2003, 5 ♂, 1 ♀, 18.IV.2003, 1 ♂, 5 ♀, 1.IV.2004; 5 ♀, Fuencaliente, 6.IV.2004; 1 ♂, 1 ♀, 28.III.2005; 8 ♂, 5 ♀, 4 km SW Puntagorda, 30.III.2005; in coll. UMB, MICN, SDEI, coll. Haeseler.

Further studied material. SPAIN • Islas Canarias, La Palma: 3 ♂, Los Llanos de Aridane, 28.III.2002; 1 ♂, 6 ♀, La Laguna, 1.IV.2002, 1 ♂, same locality, 3.IV.2002; 6 ♂, Todoque, 4 km S Los Llanos, 1.IV.2002; 2 ♂, 1 ♀, Las Nieves, 3.IV.2002, 3 ♂, same locality, 13.IV.2003, 2 ♂, 14.IV.2003, 1 ♀, 7.IV.2004, 2 ♂, 9.IV.2004, 3 ♂, 25.III.2005; 2 ♂, Las Indias, 3 km NW Los Canarios, 5.IV.2002; 1 ♂, San Nicolas, 7 km SE Los Llanos, 2.IV.2004, 4 ♂, same locality, 1 ♀, 6.IV.2002, 1 ♀, 7.IV.2002; 7 ♂, 2 ♀, Fuencaliente, 28.III.2005; 9 ♂, 5 ♀, Buenavista, 3 km S Santa Cruz de la Palma, 9.IV.2004; 4 ♂, Tacante, 2 km S El Paso, 13.IV.2004, Barkemeier leg., 9 ♂, 1 ♀, same locality, 27.III.2005; 1 ♂, 3 ♀, San Andres, 10 km N Santa Cruz de la Palma, 1.IV.2005; 4 ♂, 2 ♀, Echedey 6 km S El Paso, 22.IV.2007, 4 ♂, 6 ♀, same locality, 26.IV.2007; 1 ♀, same locality, 28.IV.2007, Riemann leg.; 1 ♀, Los Brecitos, 6 km NNW El Paso, 28.IV.2007.

Flower visits. *Ruta pinnata*, *Jasminum odoratissimum*, *Sonchus palmensis*, *Euphorbia balsamifera.*

Derivatio nominis. The species is named after its place of origin, the Canary Island of La Palma.

Hylaeus (*Paraprosopis*) *maderensis* (Cockerell, 1921)

Prosopis maderensis Cockerell, 1921: 363, ♀. Portugal, Madeira, Deserta Grande. Holotype UMO Oxford.

Prosopis (*Paraprosopis*) *pictipes maderensis* Saunders, 1903 – Warncke 1972: 749.

Diagnosis. Species with a completely black body, except for a yellow stripe on the front of the anterior tibia; mask yellow, in females reduced to two spots in the middle paraocular area, while in males the supraclypeal area is black (Fig. 31). Face of female is broadly trapezoidal, while the face of the male is rounded, with compound eyes bulging below. The body is covered with erect white hairs. The propodeum rounded, with short reticulate wrinkles only at the base. The mesosoma has dense, moderate punctation, T1 shagreen and with somewhat finer and more scattered punctation. Terminalia of males (Fig. 81): Genital capsule conventional, oval in outline, gonoforcipes bluntly pointed in dorsal view; S8 with broad apical lobe, distal lobes with fine setae all around; S7 with long elliptical distal transparent lobes, proximal lobes broad at the base, tapering to a point, sclerotised, without setae.

Distribution. Portugal, Madeira Archipelago: Madeira, Deserta Grande; Porto Santo (Kratochwil and Schwabe 2018).

Hylaeus (*Paraprosopis*) *azorae* (Warncke, 1992)

Prosopis (*Paraprosopis*) *azorae* Warncke, 1992: 781–782, ♂. Portugal, Azores, Pico. Holotype OLML Linz.

Diagnosis. The species, of which so far only one male is known, resembles *Hylaeus maderensis* in habitus and punctation. It is also completely black and distinctly hairy. However, the scape is enlarged and expanded, and the flagellum yellow below. The clypeus and two narrow stripes on the lateral clypeus margins are flecked light yellow (Fig. 30). The head is round, the face dorsally broadened and bulging, ventrally strongly narrowed and the compound eyes bulbous. The frontal area is shallowly impressed with dense punctation in the middle. The propodeum is somewhat sloping, rounded, without sharp ridges. Terminalia of the holotype (Fig. 87): Genital capsule with very slender and tapering gonoforcipes, these with lateral setae; S8 apical lobe with a long, broadened base and elliptical process, the edge with fine setae; S7 with sclerotised proximal lobes, these are slightly larger than the narrow transparent distal lobes.

Distribution. Portugal, Azores: Pico Island.

Identification keys to species of *Hylaeus* (*Paraprosopis*) of the Canary Islands

Males

1	Boundary between vertex and occiput with sharp edge (Fig. 39); mask yellow	***H.* (*P.*) *ater* (Saunders, 1903)**
–	Boundary between vertex and occiput rounded (Fig. 40); mask white or yellow	**2**
2	Tibia 3 ringed basally ivory-white, metatarsi ivory-white; T1 depression with lateral fringes	***H.* (*P.*) *canariensis* Erlandsson, 1983**
–	Tibia 3 basally not white-ringed; if only metatarsus 1, 2 or 3 white or tibia 3 ringed, then without fringes on T1; T1 with or without fringes	**3**
3	T1 with distinct white fringes; mask white	***H.* (*P.*) *palmensis* Haeseler, sp. nov.**
–	T1 without distinct fringes; mask ivory white or yellow	**4**
4	Mask white or ivory white; T1 without fringes; integument shagreen, dull, scutellum distinctly shagreen	***H.* (*P.*) *hohmanni* Dathe, 1993**
–	Mask yellow; T1 lateral with distal ciliar fringes; wide areas of integument shiny; scutellum often indistinctly shagreen	**5**

5 Lateral facial spots ventrally shortened, separated from the clypeus by a distinct black stripe on the lower part (Fig. 37A); supraclypeal area barely notched at the tip; omaulus evenly rounded ***H. (P.) hierro* Haeseler, sp. nov.**

– Lateral facial spots ventrally not shortened, bounded by an even, narrow line (Fig. 36A); supraclypeal area often with wide impression at the tip; omaulus bulging ***H. (P.) gomerensis* Haeseler, sp. nov.**

Females

1 Boundary between vertex and occiput with sharp edge (Fig. 39); lateral facial spots, if present, yellow ***H. (P.) ater* (Saunders, 1903)**

– Boundary between vertex and occiput rounded (Fig. 40); lateral facial spots, if present, white or yellow **2**

2 Omaulus evenly rounded, episternal groove without transverse ridge at the lower end (Fig. 42); T1 with fringes **3**

– Omaulus bulging above episternal groove, this with distinct transverse ridge at lower end (Fig. 41); T1 with or without fringes **4**

3 Medial area of propodeum reticulately wrinkled, also on side parts, margined to terminal area; face laterally marked with white ***H. (P.) palmensis* Haeseler, sp.nov.**

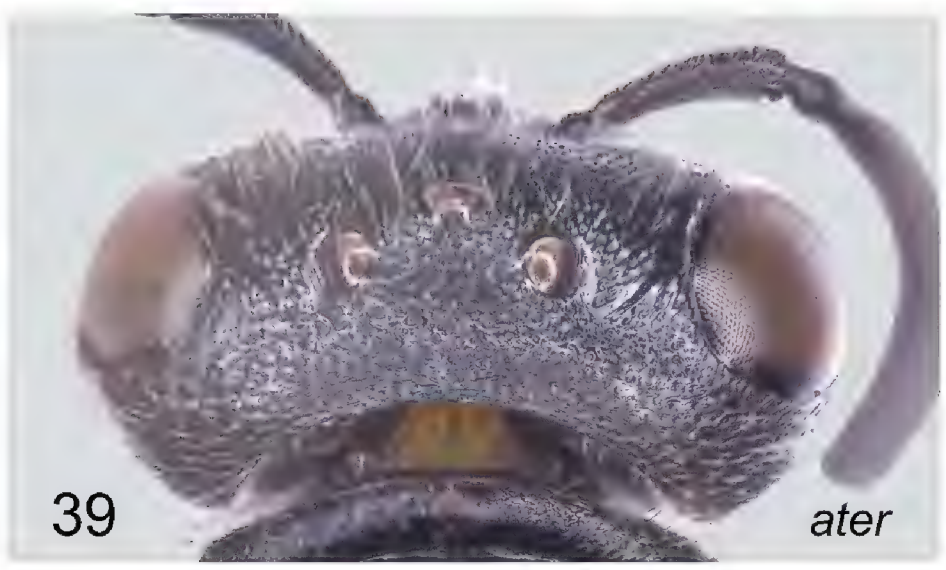
– Medial area of propodeum only basally reticulate wrinkled, laterally only with few ridges, transition to terminal area rounded; face with or without marks ***H. (P.) canariensis* Erlandsson, 1983**

4 Upper supraclypeal area with abrupt transition to the frons, often divided by deep groove (Fig. 36D); omaulus strongly bulging above the lower end of the episternal groove; maxillary palps shorter than flagellomeres 1–5 ***H. (P.) gomerensis* Haeseler, sp.nov.**

– Supraclypeal area gradually merging into the frons, without a groove; omaulus less protruding above lower end of episternal groove, maxillary palps as long as flagellomeres 1–5 or longer **5**

5 T1 without fringes; scutellum dull, distinctly shagreen ***H. (P.) hohmanni* Dathe, 1993**

– T1 with narrow lateral ciliar fringes; scutellum shiny, shagreen often indistinct ***H. (P.) hierro* Haeseler, sp.nov.**



Figures 39, 40. *Hylaeus* (*Paraprosopis*) species. Head, dorsal view. **39.** *H.* (*P.*) *ater* (Saunders), vertex with sharp back edge. **40.** *H.* (*P.*) *palmensis* Haeseler, vertex with rounded back edge.

Figures 41, 42. *Hylaeus* (*Paraprosopis*) species. Mesopleuron of females in lateral view. **41.** *H.* (*P.*) *gomerensis* Haeseler, omaulus with edge to episternal groove. **42.** *H.* (*P.*) *palmensis* Haeseler, omaulus rounded, without edge to episternal groove.

East Palaearctic: Japan

Hylaeus (*Paraprosopis*) *incomitatus* Snelling, 1970

Hylaeus incomitatus Snelling, 1970b: 18–19. ♀. Japan, Bonin Islands (Southwest Bay on Ani-jima, Chichi-jima Group). Holotype USNM, No. 70755.

Hylaeus (*Paraprosopis*) *incomitatus* Snelling, 1970b – Ikudome 1989: 239, 246–250. ♀♂.

Diagnosis. Body length 4–5 mm. Slender species with fine and sparse punctation. Head roundish, slightly wider than high (Fig. 43). Lateral yellow face marks well-developed, terminating at the lower end of facial fovea in female, at the upper level of antennal sockets in male. Clypeus with yellow stripe on the medio-lower part in female, extensively yellow in male. The following parts yellow: collar of pronotum, axillae, tubercles, tegulae, apical spots on all femora, basal stripes on all tibiae, and especially labrum and mandibles in male. Ferruginous are flagellum, legs, apical margin of clypeus in male. Mesopleura shiny, distinctly lineo-reticulate. Propodeum with basal horizontal plane longer than length of metanotum, but well rounded; medial area not defined by any carina, basally only with short irregular rugulae. Metasomal terga shiny, microscopically lineo-reticulate. Dorsal habitus of female Fig. 47. Male terminalia (Fig 82): distal part of apical lobes S7 poorly developed; gonoforcipes comparatively short, 2.5 times as long as gonobase. Wings with stigma and veins pale brown.

Distribution. Japan: Ogasawara Islands [Bonin Islands]: Ani Island, Haha Island.

Remarks. Endemic to the oceanic Ogasawara Islands, located 1,000 km SSE of Tokyo.

Hylaeus (*Paraprosopis*) *hirashimai* Ikudome, 1989

Hylaeus (*Paraprosopis*) *hirashimai* Ikudome, 1989: 239–246. ♀♂. Japan, Kyushu. Holotype ♀ ELKU, No. 2712.

Diagnosis. Body comparatively short: 4.5–5.5 mm in female, 3.5–4.5 mm in male. Head roundish, slightly wider than long. The pattern of yellow marks on the face in both sexes (Fig. 44) is generally similar to that of *Hylaeus incomitatus*, but male labrum and mandibles black; axillae black. The species is closely allied to *H. meridianus*, but differs in the following: scape in male slightly expanded, with yellow stripe; mesonotum with punctation denser and slightly stronger; metanotum roundly convex, more roughened; mesopleura with distinctly larger and denser punctation; propodeum sculptured irregularly by distinct carinae on the anterior and lateral parts, its medial area clearly defined by distinct oblique carinae, posteriorly steeply slanting. Dorsal habitus of female Fig. 48. Male terminalia (Fig. 83): Distal part of apical lobes S7 expanded posteriorly as in *H. munageus* or *H. yasumatsui*, gonoforcipes comparatively long, about 3 times as long as gonobase.

Distribution. Japan: Honshu, Izu Islands (Nii Island, Hachijo Island), Kyushu, Okinoshima Islands, Tsushima Islands, Koshiki Islands, Ryukyu Islands ((Tane Island, Yaku Island, Take Island, Iwo Island, Kuro Island, Suwanose Island, Akuseki Island).

Remarks. This species is widespread in Japan except Hokkaido (Ikudome 2024:137), but it does not occur south of Watase's Line, which is regarded as the border between the Palaearctic and Oriental regions on the Ryukyu Islands (Ikudome 1998).

Figures 43–46. *Hylaeus* (*Paraprosopis*) species. Head, frontal view; top row: male, bottom row: female. **43.** *H.* (*P.*) *incomitatus* Snelling; **44.** *H.* (*P.*) *hirashimai* Ikudome; **45.** *H.* (*P.*) *meridianus* Yasumatsu & Hirashima; **46.** *H.* (*P.*) *munageus* Ikudome. Scale bar: 0.5 mm.

Hylaeus (*Paraprosopis*) *meridianus* Yasumatsu & Hirashima, 1965

Hylaeus meridianus Yasumatsu & Hirashima, 1965: 239, 251–252. ♀. Japan, Amami Island. Holotype ELKU.

Hylaeus (*Paraprosopis*) *meridianus* Yasumatsu & Hirashima, 1965 – Ikudome 1989: 251–256, ♀♂.

Diagnosis. Body comparatively short: 4.5–5.0 mm in female, 3.5–4.0 mm in male. Head slightly wider than long in front view, as in *Hylaeus incomitatus*, but differs from the latter in black axillae. The pattern of yellow marks on the face in both sexes (Fig. 45) is generally similar to that of *H. hirashimai*, but scape of male less expanded and without yellow stripe. In male, supraantennal areas of frons impunctate, smooth and shiny, especially as in *H. hirashimai*, *H. munageus* or *H. yasumatsui*. Male clypeus elongated in front, longer than maximum width of lower part as in *H. yasumatsui*. Genae in lateral view narrower than eye in male. Punctures on mesonotum and mesopleura distinctly smaller and weaker than those of *H. hirashimai*. Propodeal medial area indistinctly defined, mostly smooth and shiny in female, and with short longitudinal carinae on the basal part in male. Metasomal T1 smooth, hardly punctate, shiny. Dorsal habitus of female Fig. 49. Male terminalia (Fig. 84): Distal part of apical lobes of S7 hardly developed, as in *H. incomitatus*; gonoforcipes of male genitalia long, about 5 times as long as gonobase.

Distribution. Japan: Ryukyu Islands (Amami Island, Okinawa Island, Izena Island).

Remarks. Endemic to the middle Ryukyu Islands, not occurring north of Watase's line. Therefore, it is usually considered to be a member of the Oriental fauna. *Hylaeus meridianus* and *H. hirashimai* are considered to be closely related (Ikudome 1998) and presumably evolved as separate species due to geographic isolation.

Hylaeus (*Paraprosopis*) *munageus* Ikudome, 2004

Hylaeus (*Paraprosopis*) *thoracicus* Ikudome, 1989: 233–240. ♀♂. Japan, Hokkaido. Holotype ♀ ELKU, No. 2711. Not *Hylaeus thoracicus* Fabricius, 1793.

Hylaeus (*Paraprosopis*) *munageus* Ikudome, 2004: 5. Replacement name.

Diagnosis. Body short: 4.5–5.0 mm in female, male 3.5–4.0 mm. Head roundish, slightly wider than long in frontal view. The pattern of yellow marks on the face in both sexes (Fig. 46) is generally similar to that of *Hylaeus hirashimai* or *H. meridianus*, but antenna of male with scape distinctly stout, black; flagellum below brownish to yellowish brown. Hairs on mesonotum and scutellum whitish, distinctly long, noticeably erect in both sexes. Mesonotum and mesopleura with distinct punctation; sparser on the latter. Anterior part of propodeal enclosure with irregular and strong carinae, its posterior part well separated from the anterior part by a strong transverse carina, nearly abrupt in both sexes. Dorsal habitus of female Fig. 50. Male terminalia (Fig. 85): Distal part of apical lobes of S7 distinctly expanded posteriorly as in

Figures 47–51. *Hylaeus* (*Paraprosopis*) species. Females, dorsal view; top row: mesonotum, bottom row: propodeum and metasoma. **47.** *H.* (*P.*) *incomitatus* Snelling; **48.** *H.* (*P.*) *hirashimai* Ikudome; **49.** *H.* (*P.*) *meridianus* Yasumatsu & Hirashima; **50.** *H.* (*P.*) *munageus* Ikudome; **51.** *H.* (*P.*) *yasumatsui* Snelling. Scale bar: 0.5 mm.

Figures 52–56. *Hylaeus* (*Paraprosopis*) species. Males. Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **52.** *H. (P.) pictipes* Nylander; **53.** *H. (P.) taeniolatus* Förster; **54.** *H. (P.) aenigmatis* Dathe; **55.** *H. (P.) xanthopoda* (Vachal); **56.** *H. (P.) dinkleri* (Friese). Scale bar: 0.5 mm.

H. hirashimai or *H. yasumatsui*; gonoforcipes moderately long, about 3 times as long as gonobase, as in *H. hirashimai* or *H. yasumatsui*; gonocoxite strongly convex anteriorly in lateral view. Penis valves are the thickest among the five Japanese *Paraprosopis* species.

Distribution. Japan: Hokkaido, Honshu.

Remarks. Currently, this species appears to be restricted to northern Japan.

Hylaeus (*Paraprosopis*) *yasumatsui* Snelling, 1970

Hylaeus (*Paraprosopis*) *yasumatsui* Snelling, 1970b: 5–10. ♂♀. Japan, Bonin Islands (Haha-jima). Holotype ♂ USNM, No. 70756. – Ikudome 1989: 239, 256–260. ♀♂.

Diagnosis. Body length is the longest of the five Japanese species: 6 mm in female, 5.5 mm in male. Head in frontal view somewhat wider than long in both sexes. Clypeus usually with yellow stripe in both sexes (Fig. 35). Male antenna with scape somewhat expanded and a weak yellow stripe below; flagellum underside brownish to yellowish-brown in both sexes. Tegulae and axillae without yellow markings. Genae in lateral view narrower than eye in both sexes. Hairs on mesonotum and scutellum whitish, noticeably erect, but shorter than those in *Hylaeus munageus*. Punctation on mesonotum and mesopleura fine and dense. Propodeal medial area without any carina separating it from adjacent parts, but well-defined and round, with irregular longitudinal carinae basally. Male T1 with scattered weak but distinctly fine punctation. Dorsal aspects of female Fig. 51. Male terminalia (Fig. 86): Distal part of apical lobes of S7 expanded posteriorly as in *H. hirashimai* or *H. munageus*; gonoforcipes about 3 times as long as gonobase as in *H. hirashimai* or *H. munageus*. Wing dull translucent with stigma and vein fuscous, unique among the Japanese species.

Distribution. Japan: Izu Islands (Nii Island), Ogasawara Islands (Haha Island, Muko Island).

Remarks. This species appears to be restricted to some islands, scattered from 100 km to 650 km south of Tokyo, from the Izu Islands to the Ogasawara Islands. Whereas the former are volcanic islands, the latter oceanic.

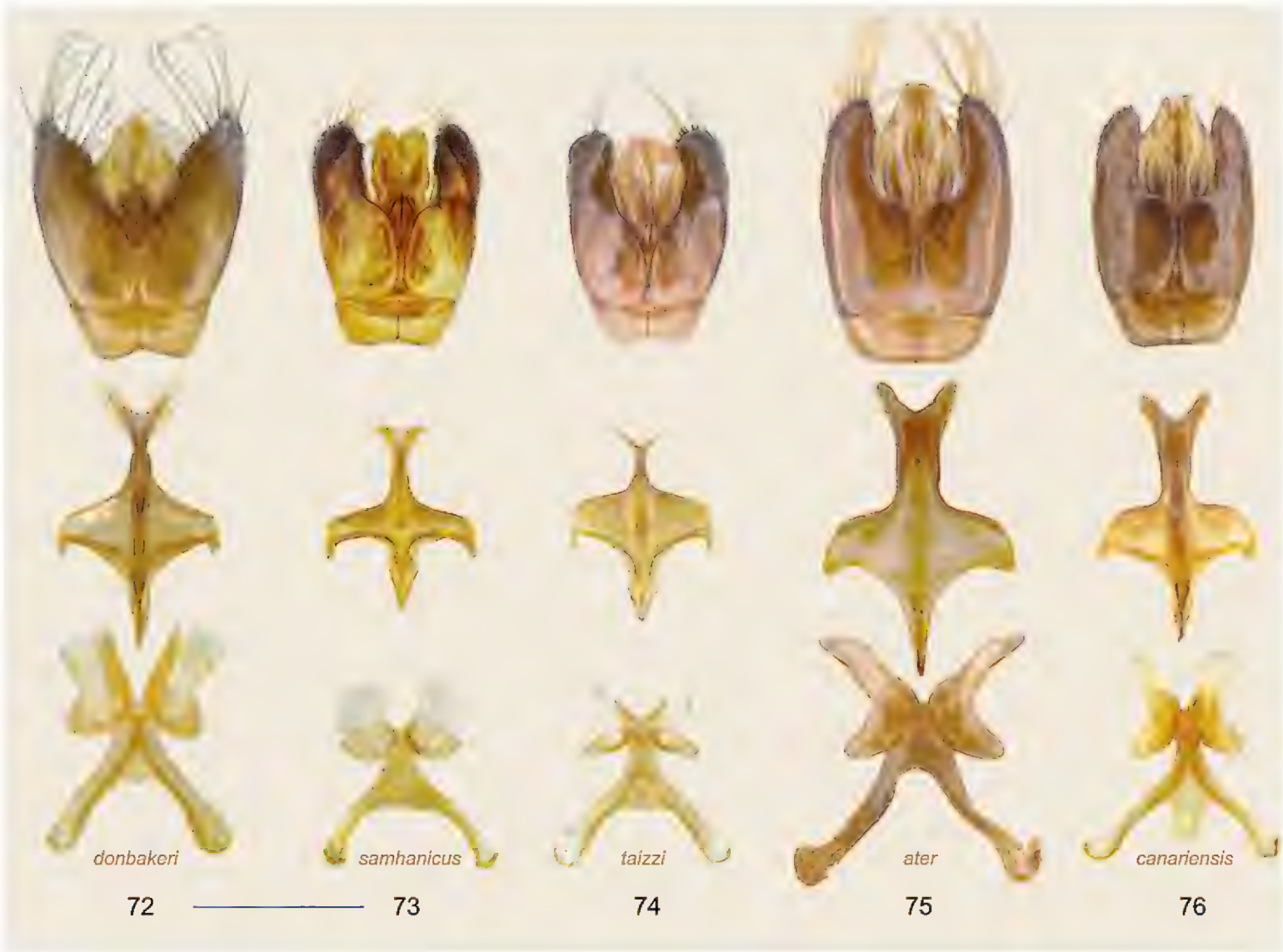
Identification key to species of the *Hylaeus* subgenus *Paraprosopis* of Japan

1	Axillae yellow marked (Fig. 47); supraantennal area shagreen, matt	***H.* (*P.*) *incomitatus* Snelling, 1970**
–	Axillae without yellow marks; supraantennal area smooth and shiny	**2**
2	Pilosity on mesosoma conspicuous, long and erect; male antenna with scape distinctly stout; propodeum medial area with clear edge	***H.* (*P.*) *munageus* Ikudome, 2004**
–	Pilosity on mesosoma short, appressed; male antennae with scape slender or somewhat expanded; propodeum medial area with or without a clear edge	**3**
3	Males	**4**
–	Females	**6**
4	Propodeal medial area distinctly defined, with strong wrinkles up to the edge, posterior part truncate	***H.* (*P.*) *hirashimai* Ikudome, 1989**
–	Propodeal medial area weakly defined, with weak carinae, surface anteriorly partly shagreen, posterior part rounded	**4**
5	Metasomal T1 with scattered weak but distinct punctation; clypeus sometimes with broad yellow stripe in the middle	***H.* (*P.*) *yasumatsui* Snelling, 1970**
–	Metasomal T1 hardly punctate, shiny; clypeus completely yellow	***H.* (*P.*) *meridianus* Yasumatsu & Hirashima, 1965**
6	Propodeal medial area distinctly defined, anteriorly with strong carinae, posteriorly truncate (Fig. 48)	***H.* (*P.*) *hirashimai* Ikudome, 1989**
–	Propodeal medial area weakly defined, anteriorly with weak carinae, posteriorly rounded	**7**
7	Punctation on mesonotum (Fig. 51) and mesopleura shallow and weak, surface matt	***H.* (*P.*) *yasumatsui* Snelling, 1970**
–	Punctation on mesonotum (Fig. 49) and mesopleura distinct, surface shiny	***H.* (*P.*) *meridianus* Yasumatsu & Hirashima, 1965**

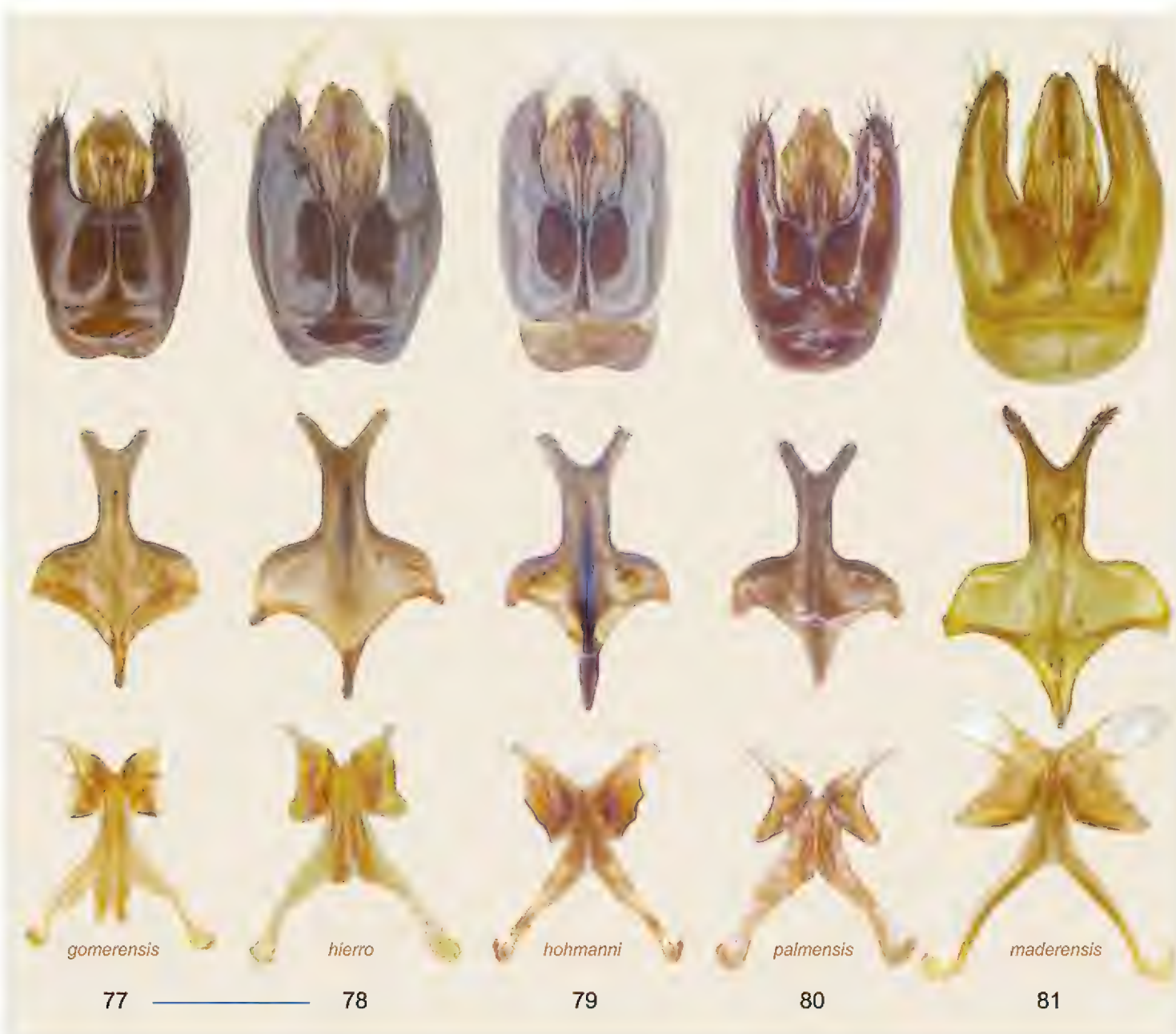
Figures 57–61. *Hylaeus* (*Paraprosopis*) species, males. Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **57.** *H. (P.) gujaraticus* (Nurse); **58.** *H. (P.) gribodoi* (Vachal), holotype, preparation shrunken; **59.** *H. (P.) lactipennis* (Benoist); **60.** *H. (P.) mendibus* (Warncke); **61.** *H. (P.) sinuatus* (Schenck). Scale bar: 0.5 mm.

Figures 62–66. *Hylaeus* (*Paraprosopis*) species, males. Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **62.** *H. (P.) soror* (Pérez); **63.** *H. (P.) styriacus* Förster; **64.** *H. (P.) clypearis* (Schenck); **65.** *H. (P.) lineolatus* (Schenck); **66.** *H. (P.) livius* (Warncke). Scale bar: 0.5 mm.

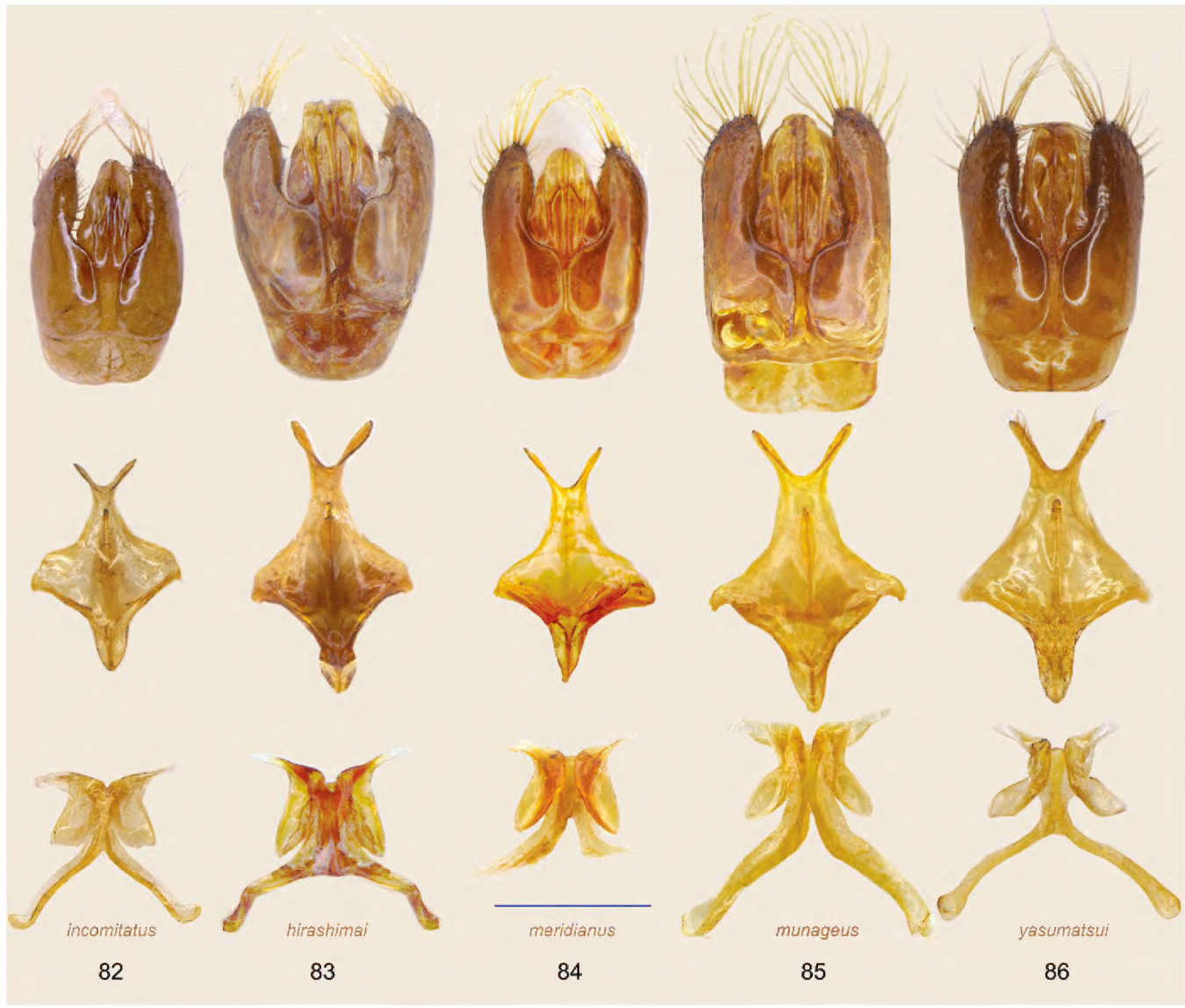
Figures 67–71. *Hylaeus* (*Paraprosopis*) species, males. Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **67.** *H. (P.) decaocto* (Warncke); **68.** *H. (P.) guptai* Saini & Chandra; **69.** *H. (P.) concinnus* Cockerell; **70.** *H. (P.) nigrocallosus* Mor.; **71.** *H. (P.) emir* Dathe. Scale bar: 0.5 mm.



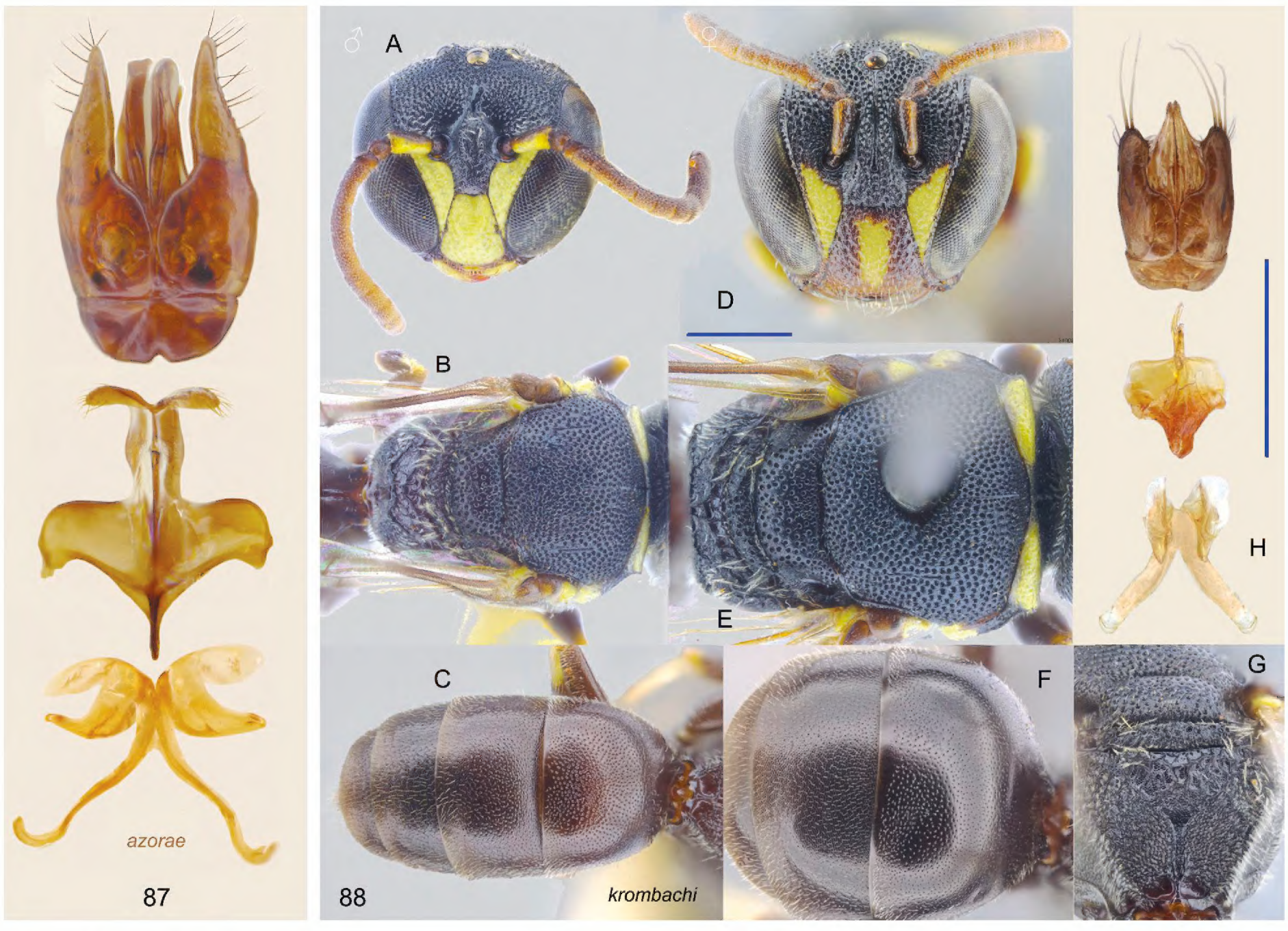
Figures 72–76. *Hylaeus* (*Paraprosopis*) species, males Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **72.** *H. (P.) donbakeri* Dathe; **73.** *H. (P.) samhanicus* Dathe; **74.** *H. (P.) taizzi* Dathe; **75.** *H. (P.) ater* (Saunders); **76.** *H. (P.) canariensis* Erlandsson. Scale bar: 0.5 mm.



Figures 77–81. *Hylaeus* (*Paraprosopis*) species, males. Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **77.** *H. (P.) gomerensis* Haeseler; **78.** *H. (P.) hierro* Haeseler; **79.** *H. (P.) hohmanni* Dathe; **80.** *H. (P.) palmensis* Haeseler; **81.** *H. (P.) maderensis* (Cockerell). Scale bar: 0.5 mm.



Figures 82–86. *Hylaeus* (*Paraprosopis*) species, males. Terminalia, upper: genital capsule, middle: sternum 8, lower: sternum 7. **82.** *H. (P.) incomitatus* Snelling; **83.** *H. (P.) hirashimai* Ikudome; **84.** *H. (P.) meridianus* Yasumatsu & Hirashima; **85.** *H. (P.) munageus* Ikudome; **86.** *H. (P.) yasumatsui* Snelling. Scale bar: 0.5 mm.



Figures 87, 88. 87. *Hylaeus* (*Paraprosopis*) *azorae* (Warncke), Terminalia. **88.** *Hylaeus krombeini* Snelling, 1970, paratypes. **A–C, H** Male, **D–G** Female; **A, D** Head, **B, E** Mesosoma, **C, F** Metasoma dorsal **G** Propodeum, **H** Male terminalia. Scale bar: 0.5 mm.

Addendum

Hylaeus (subgenus incertus) *krombeini* Snelling, 1980

Hylaeus (*Paraprosopis*) *krombeini* Snelling, 1980: 3–5, ♂♀. Sri Lanka, Hunuwiligama, Anuradhapura District, Holotype ♂, USNM Washington.

Hylaeus krombeini Snelling, 1980, **subgenus incertus**, not *Paraprosopis*.

Note. This is so far the only species from the Indo-Malayan (Oriental) region that has been assigned to the subgenus *Paraprosopis*. Despite some shared characters, it exhibits clear differences to *Paraprosopis* as defined here. Snelling (1980: 4, figs 3–5) did not illustrate the male terminalia precisely. Fig. 88 results from the re-examination of a paratype in the USNM Washington. Male terminalia (Fig. 88H): S7 actually has a transparent surface on the distal lobe, but lacks an equivalent on the proximal lobe. S8 ends in a claw-like structure that is vertically aligned. In the female the foveae faciales are not prolonged, the sculpture of both sexes is generally very coarse, and the omaulus is even partially lamellate. The true subgeneric affiliation is most likely to be with other species occurring in the South Indian region, where the fauna is, however, at present too poorly known for this to be assessed. Photos of the holotype are available on the Entomology Collections database of the Smithsonian Institution, USNM (see References "Smithsonian Institution").

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